

ESUR – SUR 2011

Book of Abstracts

International Urogenital Radiology Joint Meeting of European Society of Urogenital Radiology and Society of Uroradiology

Dubrovnik, Croatia
Hotel Dubrovnik Palace
October 13-16, 2011

MAIN TOPICS: Renal and Female Imaging



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ESUR – SUR 2011

**International Urogenital Radiology
Joint Meeting of European Society of Urogenital Radiology
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MAIN TOPICS: Renal and Female Imaging

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October 13-16, 2011

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Diagnostic Imaging

Book of Abstracts

MDSS - Member's day scientific session, **LS** - Lecture session, **SS** - Scientific session, **WS** - Workshop

Thursday, October 13, 2011

Member's Day

Moderators: Gertraud Heinz-Peer; Vienna, AT and Ronald Zagoria, Winston Salem, NC, US

MDSS1

John Leyendecker, M. Jennings Clingan, David D. Childs, Kaan Tangtiang, Pratish Shah, Ronald J. Zagoria; Winston Salem, NC, US. **Can multiparametric MRI predict histologic subtype of renal cell carcinoma in clinical practice?**

Purpose: To determine the positive predictive value of MRI for diagnosis of clear cell and papillary subtypes of RCC among a mixed population of proven solid renal masses. **Methods:** 151 histologically proven solid renal lesions were examined with MRI. Two radiologists independently assessed lesion signal intensity on T1W, T2W and DWI images, lipid or hemosiderin content, and enhancement characteristics. **Results:** Lesions included 78 ccRCC, 40 pRCC, 7 lesions with ccRCC and pRCC features, and 12 malignant lesions other than ccRCC or pRCC, 10 oncocytomas, 2 angiomyolipomas, and two nonneoplastic lesions. When both readers were confident of a diagnosis of ccRCC (n=27), PPV for ccRCC was 96%. When both readers were confident of a diagnosis of pRCC (n=33), PPV for pRCC was 77%. The best predictor of ccRCC was presumed lipid on chemical shift imaging (n=29, 100% PPV). PPV for pRCC of hypointensity on FST2W (homogeneous or heterogeneous, n=58) and hypoenhancement was only 60%, but this increased to 90% for homogeneous masses (n=10). The presence of hemosiderin or hyperintensity on DWI did not improve PPV for pRCC in our series. **Conclusions:** Subtyping RCC with MRI remains imperfect, but in a small subset of lesions with specific features, PPV can be high.

MDSS2

4

Lorenzo Mannelli, K Linnau, ML Gunn, TJ Dubinsky; Seattle, WA, US. **Respiratory Triggered Diffusion Tensor Imaging MR of the kidney at 3T: feasibility study.**

Introduction: The aims of this study are: 1) to demonstrate that respiratory-triggered diffusion tensor imaging (DTI) of the kidneys is feasible at 3T and 2) to demonstrate that for b values increments the fractional anisotropy (FA) and apparent diffusion coefficient (ADC) decrement is in the same percentage range. **Methods:** Respiratory triggered DTI-MRI was performed with 3T scanner on 3 subjects. One DTI sequence was used with 3 different pairs of b values: 0-150 s/mm²; 0-400 s/mm², 0-800 s/mm². The acquisition time was 98 seconds, the scanning time per sequence ranged between 212 and 329 seconds depending of the volunteers respiratory rates. Regions-of-interest (ROI) were selected in the renal medulla and renal cortex in the ADC and FA maps of the 6 imaged kidneys. **Results:** The ADC and FA values were in the range of those reported in previous publications using non-respiratory triggered DTI sequences. The renal medulla had a 27% FA decrement and a 24% ADC decrement at higher b values. **Discussion:** This study demonstrates that respiratory-triggered DTI of the kidneys is feasible at 3T. This study also demonstrates that the decrease in the renal medulla FA and ADC values for increasing b values is in the same percentage range.

MDSS3

Naoki Takahashi, Kewalee Sasiwimonphan, Bradley C. Leibovich, Akira Kawashima; Rochester, MN, US. **Small (< 4cm) renal mass: differentiation of angiomyolipoma without visible fat from renal cell carcinoma utilizing MR imaging**

Purpose: To evaluate if MR can differentiate small angiomyolipoma (AML) without visible fat from renal cell carcinoma (RCC). **Materials and Methods:** 111 patients (69 male, 42 female) with 119 tumors (15 AML without visible fat and 104 RCC) who had preoperative MR were included. T1-weighted FSE, fat-suppressed T2-weighted FSE, in-and-opposed-phase GRE and fat-suppressed 3D T1-weighted spoiled GRE before and after administration of gadolinium contrast material were obtained. Single radiologist measured signal intensity of tumor in each sequence. T1- and T2-signal intensity ratio (T1SI-ratio, T2SI-ratio) (ratio of tumor to renal cortex signal intensity on T1- and T2-weight images), signal intensity index (SII) [(S_{lin}-S_{lopp})/(S_{lin}×100)] and arterial-to-delayed enhancement ratio (AD-ratio) [(S_{lart}-S_{lpre})/(S_{ldelay}-S_{lpre})] were compared between AML and RCC. **Results:** AML had significantly higher T1SI-ratio, lower T2SI-ratio, higher SII and higher arterial-to-delayed enhancement ratio than those of RCC (p=0.02, p=0.03, p=0.01 and p<0.0001, respectively). Combination of T2SI-ratio < 0.9 and [(SII > 20% and T1SI-ratio > 1.2) or AD-ratio > 1.5] had a sensitivity, specificity and accuracy of 73.3% (11/15), 99.0% (103/104), and 95.8% (114/119) for differentiating AML from RCC. **Conclusion:** MRI is accurate in differentiating AML without visible fat from RCC.

MDSS4

Jane Belfield, S.Powell; Liverpool, UK. Comparison of MRA and CT in Assessing Potential Living Renal Donors

Introduction: CT replaced MRA for living donor assessment in a large tertiary centre 12 months ago. During the transition period, some patients underwent MRA and CT. Aim: To compare MRA and CT findings in potential renal donors. Method: Patients with both MRA and CT were included. Data was collected retrospectively for demographics, incidental findings and vascular anatomy; MRA and CT results were compared. Results: 16 patients underwent MRA and CT (male: female = 7:9). Age range 23-63 years with mean 46.8. MRA demonstrated single arteries and veins bilaterally in 9/16 (56%), 2 right and 1 left artery 3/16 (19%), 1 right and 2 left 2/16 (12.5%), single arteries, veins not seen 2/16 (12.5%). CT and MRI results concurred in 10/16 (62.5%) cases. No findings were seen on MRA that were not identified on subsequent CT. 6/16 (37.5%) cases CT identified the following, not seen on MRA– 2/6 - 2 right renal veins. 3/6 - multiple renal arteries not seen, one of which had retro-aortic left renal vein. 2/6 patients had renal calculi not seen on MR, of which one had complex vascular anatomy as described above. Conclusion: CT was more accurate than MRA in demonstrating vascular anatomy and renal calculi.

MDSS5

Sameh Hanna, S.Abdel Rahman, N.Barsoum, HM.El Gammal; Cairo, EG. Role of MDCT in the evaluation of patients with hematuria

Objectives: To evaluate the role of MDCT in the diagnosis of cases with hematuria. Methods: Fifty nine patients presenting with hematuria were diagnosed using different techniques of MDCT, over a period of 2 years. According to the patient's condition & suspected lesion, the protocol of the study was tailored. In suspected urinary stones, thin slice non-enhanced cuts were obtained. A comprehensive multiphasic upper urinary tract CT study was performed in suspected renal lesions. This included unenhanced and triphasic axial CT of the kidneys. Shortly after starting our study, the quad phase technique was modified to be triphasic instead, aiming to reduce the radiation dose, where the unenhanced CT was discarded. In urethral lesions, CT urethrography was performed. Results: The cause of hematuria were divided into renal (n=36), ureteric (n=6), vesical (n=4) and urethral (n=13) pathologies. Conclusion: Contrast-enhanced multiphasic MDCT urography can demonstrate a wide spectrum of disease in hematuria patients. Virtual cystoscopy can be beneficial in cases with bladder pathologies. In addition, urethral lesions can be properly assessed by CT urethrography. So, MDCT has a potential to provide accurate evaluation of patients with hematuria with a single comprehensive CT examination. Keywords: Hematuria, MDCT Urography, Urinary tract lesions

MDSS6

Norman Loberant, Alexei Kolesnikov, Orly Yakir; Nahariya, IL.CTU- a single institution review

Objective: To review indications and accuracy of CTU. Methods: Retrospective study: 134 patients undergoing CTU for hematuria. Age range: 13-88, mean 54; 71.6% males, 28.4% females. Clinical and laboratory data were recorded, and CTU images were reviewed and compared to final diagnosis. Results: In 17/134 a definitive diagnosis was provided by the non-contrast scan. 16/17 showed ureteral stone with signs of obstruction; 1/17 periappendiceal abscess. In this group mean age was 46 years, 35%<40 years of age, 88% were male. 71% had acute pain. In the remaining 117 patients, mean age was 54 years, 23%<40 years of age, 69% were male; 39% had acute pain; 81/117 had negative CTU. In the remaining 36 patients, the examinations showed abnormalities which were either diagnostic or suspicious: ureteral tumor (1), renal tumor (3), bladder tumor (27) (including indeterminate studies with bladder wall abnormalities), both bladder/renal tumor (1), pyelonephritis (2). Statistical analysis of results, and correlation with follow-up will be presented. Conclusions: Exposure to IV contrast and radiation demands proper indication for CTU, especially in younger patients. Ideally, the non-contrast scan should be reviewed prior to injection. Thickened and trabeculated bladder wall is a cause of diagnostic uncertainty.

MDSS7

Josip Ćurić, Mirjana Vukelić-Marković, Petar Marušić, Ana Hrkać-Pustahija, Boris Brkljačić; Zagreb, HR. Influence of bladder distension on opacification of urinary collecting system during CT urography

The purpose of the study was to evaluate and compare opacification of the renal collecting system and ureters detected by computed tomographic urography (CTU) performed 20 min and 1 h after the ingestion of 1,000 ml of water. CTU was performed with split bolus of contrast material in 100 patients and 174 collecting systems and ureters. Results: in the group of patients that were orally hydrated 1 hour before the MSCTU examination the distal ureter was fully visualized in 86.2%. In the second group of patients the percentage of fully visualized distal ureters was 44.4%. In the group of patients hydrated 60 minutes prior the MSCTU the proximal ureter, renal pelvis and calices were fully visualized in 91.4%, 99.4 and 91%. In the group of patients hydrated 20 minutes prior to CT examination the result were 72.8%, 90% and 70%. The total

number of fully visualized urinary tract segments was significantly higher in the group of patients given oral hydration 60 minutes prior to the CT examination compared to the second group ($p < 0.01$). Oral hydration given 60 minutes prior to the MDCTU examination has been proven to give excellent results in visualization of all segments of urinary tract.

MDSS8

Ulrike L. Mueller-Lisse, Sebastian Seifert, Christoph Degenhart, Katharina Jundt, Feras Mourched, Christian G. Stief, Maximilian F. Reiser, Ullrich G. Mueller-Lisse; Munchen, GE. **CT urography (CTU) in women with primary or recurrent pelvic tumours: initial experience**

Purpose: Malignant tumours of the female pelvis account for 12-13% of newly diagnosed solid neoplasms among women in the US and Germany. German guidelines advocate diagnostic imaging for local recurrence and metastasis, while there is no recommendation for primary tumours. Excretory urography has been replaced by the excretory phase of CT urography (CTU) in many institutions. We evaluated associations between CTU findings and subsequent urology measures. **Material and Methods:** Two independent observers retrospectively evaluated CTUs of primary or recurrent female pelvic tumours obtained between 11/2007 and 10/2009 to rule out associations between CTU findings and subsequent urologic measures. **Results:** Among 30 CTUs of 27 women (age, 29-84, mean, 57 years) with 15 primary and 13 recurrent tumours, 83-100% of unremarkable proximal, middle, and distal ureter segments were completely delineated in the excretory phase (delay, 6-29, mean, 16 minutes). Common pathologies included distal ureter obstruction (19, 61%), bladder compression (13, 42%), and bladder invasion (8, 26%). Eight of 20 pathologically altered, but none of 10 unremarkable urinary tracts at CTU were subsequently subjected to urologic measures (two-tailed Fisher-Exact-Test, $p = 0.0215$). **Conclusions:** It appears that CTU is a sensible pre-therapeutic test for the urinary tract in primary and recurrent female pelvic tumours.

MDSS9

Valeria Panebianco, Valeria Buonocore, Cristina Valerio, Giammaria Busetto, Alessandro Gentilucci, Alessandro Sciarra; Rome, IT. **3T-Multiparametric MR (MRI, 1H-MRS, MRP) and PCA3 test capability to predict Gleason score in patients with PSA alteration**

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Aim of study: to establish the potential role of 3T Multiparametric MR and PCA3 test in predicting Gleason score in patients with PSA alteration. **Materials and methods:** we recruited 73 consecutive patients for prostate biopsy. Age of patients ranged between 48 and 69 years; inclusion criteria were: first random TRUS-guided prostate biopsy negative for prostate adenocarcinoma or high-grade prostate intraepithelial neoplasm, persistent elevated PSA levels (total PSA ≥ 4 ng/mL and < 10 ng/mL; mean 6,37 ng/mL), negative digital rectal examination. All patients were submitted to MR examination. Prostate biopsies and radical prostatectomy specimens were evaluated and Gleason Score (GS) was determined. **Results:** PSA analysis failed to discriminate between controls and pathology groups as well as between patients with precancerous lesions or adenocarcinoma: specificity, sensitivity and accuracy were 35%, 57% and 38%. PCA3 index showed the lower diagnostic accuracy in the differentiation of controls and adenocarcinoma groups. Discriminant analysis (DA) of all MR-parameters improve the diagnostic ability in discriminating between precancerous lesion and adenocarcinoma patients: specificity, sensitivity and accuracy were 85%, 100% and 87%. **Conclusion:** PCA3 test gives genetic information while MR provides anatomical, vascular, and metabolic profile of whole prostate showing all carcinogenesis processes.

MDSS10

Valeria Panebianco, Valeria Buonocore, Andrea Marcantonio, Danilo Lisi, Flavio Malpassini, Roberto Passariello; Rome, IT. **DWI imaging in prostate cancer: analysis of different b value and ADC maps at 3T**

PURPOSE To prospectively determine the accuracy of diffusion-weighted magnetic resonance imaging for identifying cancer in the prostate peripheral zone evaluating different b value and ADC maps. **METHODS AND MATERIALS** Forty-five patients underwent endorectal MR at 3 T magnet (Discovery M750, GE) equipped with surface phased array and endorectal coil. Scan protocol included morphologic imaging with TSE T2-weighted sequences on the axial, sagittal and coronal planes, DWI sequences at different b value (500, 1000, 3000) and dynamic contrast enhanced imaging using GRE 3D T1-weighted sequence. Image analysis was performed with quantitative and qualitative approach. Two readers in consensus recorded the presence of prostate cancer and rated the imaging quality of DWI. **RESULTS** The DWI sequence images were suitable for the evaluation of the zonal anatomy of the prostate gland and the tumor localization. In the prediction of prostate tumor foci, we noticed an improvement for tumor detection with a b value of 3000 according to ADC maps and we obtained 90% and 88% respectively for sensitivity and specificity. **CONCLUSION** DWI is a feasible technique that can be used for the differentiation of malignant and benign tissues in the prostate gland tissue. We obtained a significant improvement using high value of b (1000-3000).

MDSS11

Valeria Panebianco, Sabina Prato, Valeria Buonocore, Rocco Papalia, Danilo Lisi, Michele Gallucci, Alessandro Sciarra; Rome, IT. **3T DTI Fiber Tracking in the depiction of periprostatic nerve before and after nerve-sparing prostatectomy**

Aim of this study is to depict neuroanatomical distribution, density and relationship with capsular profile of periprostatic nerve in patients submitted to nerve-sparing prostatectomy using DTI Fiber Tracking and its control after the procedure. **Materials and Methods.** The study is performed on patients submitted to nerve-sparing prostatectomy (43 pts) at 3T Magnet ((Discovery M750, GE Healthcare) equipped with surface phased array and endorectal coil. Scan protocol includes morphologic imaging with TSE T2-weighted sequences on the axial, sagittal and coronal planes, DWI sequences at different b value (500, 1000, 3000) and 3D fast spin-echo T2 cube sequence; in addition DTI fiber tracking with b value 1000 and 16 directions (funtool protocol, version 7.4) is done. **Results.** Overlapping 3D cube sequence and fiber tracking we can obtained a precise view of the NVB in terms of: thickening of nerve fibers, distance from nerve fiber to prostate capsule, integrity and course on each part of the prostate. After nerve-sparing prostatectomy we observed the fiber DTI integrity in 35 cases. **Conclusions.** DTI fiber tracking proposed in this study, would provide an additional diagnostic tool in decision making process in the patient nerve-sparing prostatectomy management and it can evaluate the fiber integrity after the procedure.

MDSS12

Gennaro Restaino, Mariavittoria Occhionero, Marinella Malaggesse, Massimiliano Missere, Paoletta Mirk, Francesco Maria Danza, Giuseppina Sallustio; Campobasso, IT. **Cystic adenomyosis: can it represent a novel class of müllerian anomalies?**

Aim: to understand the pathogenesis of this rare condition and speculate a possible embryologic explanation for its development. **Methods and materials:** starting by the description of a case studied with US and MRI at our Institution, we searched the scientific literature for other similar cases by using as search criteria in PubMed the words: "juvenile cystic adenomyoma"; "cystic adenomyosis"; "adenomyotic cyst" **Results:** 30 cases, beyond the one that we describe, have been reported. By analyzing the reported site of the lesions, a plausible pathogenetic hypothesis is that the anomaly results from an error in the formation of the müllerian duct: these are formed from an invagination of the coelomic epithelium on the anterolateral surface of the urogenital ridge. An invagination error with duplication of a segment of the müllerian duct could explain the condition. **Conclusion:** we think that cystic adenomyosis can be included in the classification of müllerian anomalies as a novel class of the American Fertility Society classification system

MDSS13

Magda Shady, Amir Monir, M.Adel; Mansoura, EG. **Can diffusion MR imaging predict endometrial carcinoma?**

Objective: To evaluate the feasibility and value of diffusion-weighted (DW) MR imaging in the detection of uterine endometrial carcinoma and to investigate whether or not DW images offer additional value to conventional MR imaging. **Methods and materials:** 32 female patients presented with perimenopausal bleeding where US detected increased endometrial thickness 15 to 38 mm. Mean = 2.7 mm. were examined using a 1.5-T MR scanner. Diffusion MRI was done. The apparent diffusion coefficient (ADC) values of the endometrium were measured in multiple regions of interest. The lowest values were considered and were correlated with histopathological results (adenocarcinoma in 12 cases, endometrial hyperplasia in 20 cases. **Results:** The mean ADC values of endometrial carcinoma was $(0.93) \times 10^{-3} \text{ mm}^2/\text{s}$, which was much lower than that of hyperplasia $(1.7) \times 10^{-3} \text{ mm}^2/\text{s}$. Cut off value was 1.3. Highly significant t test $P < 0.001$. **Conclusion:** DW imaging can be helpful in the detection of endometrial cancer in non-enhanced MR imaging.

MDSS14

John Spencer, WW Yap, SE Swift, MJ Weston; Leeds, UK. **The impact of MR imaging in the characterisation of adnexal masses after transvaginal US.**

Purpose: to perform a large scale audit of the use of and impact of MR imaging in routine clinical practice. **Patients and Methods:** 205 consecutive women underwent problem solving MR imaging for TVUS indeterminate adnexal lesions discovered less than 6 months previously. 109 women had TVUS probably benign (PB), 38 indeterminate (IND) and 58 probably malignant (PM) findings. Outcome measures were: surgical pathology, follow up imaging and consensus review of three radiologists in a multidisciplinary meeting. 2 women were lost to follow up. **Results:** 30 women had malignant masses. Of 109 TVUS PB women, MR detected 6 malignant masses but overcalled 6 benign masses. Of 96 TVUS IND or

PM masses, MR correctly showed 62 to be benign but undercalled 9 masses. TVUS and MR both overcalled 11 masses. Overall 79 (39%) of 203 women had masses misclassified by TVUS and 15 (7%) by MR imaging. For malignancy the NPV of MR imaging was $165 / 172 = 96\%$ and PPV was $23 / 40 = 58\%$ i.e. a greater than 1:1 ratio of malignant to benign masses referred for cancer surgery. Conclusion: MR imaging should be routinely used as second confirmatory test after indeterminate TVUS findings.

MDSS15

Ahmet T. Turgut, Harun Andic, Pinar Koşar, Ugur Kosar, Vikram Dogra; Ankara, TR. **The role of functional MRI in the diagnostic evaluation of scrotal abnormalities: preliminary findings**

Purpose: To investigate whether conventional MRI combined with functional techniques would have a role in the diagnostic work-up of patients with scrotal abnormalities after the initial US evaluation. **Materials and Methods:** The combination of US and conventional MRI combined with DWI and DCE-MRI revealed a total of 73 scrotal lesions (34 testicular, 39 extratesticular) in a prospective evaluation of 43 patients presenting with various clinical findings. MR imaging was performed with a 1.5 T magnet system. The subgroups of patients with benign and malignant testicular and extratesticular lesions were compared statistically for the signal intensity characteristics, DWI features, ADC values and patterns of contrast enhancement. The accuracy of various combinations of US and the aforementioned MRI techniques for a differentiation between malignant and benign scrotal abnormalities was investigated. **Results:** The overall accuracy of US, US+conventional MRI, US+conventional MRI+DWI, and US+conventional MRI+DWI+DCE-MRI for differentiating malignant lesions from benign abnormalities was calculated as 66%, 82%, 95% and 97%, respectively. **Conclusion:** On the basis of our experience, conventional MRI combined with functional techniques may play a crucial role in the diagnostic evaluation of scrotal abnormalities owing to the enhanced capability in making a proper distinction between malignant and benign scrotal abnormalities.

MDSS16

Peter Popovič, D. Kuhelj, V. Salapura, M. Glušič, M. Savić, S. Ponorac, M. Garbajs, P.Gregorič, B.Rus Gadžijev; Ljubljana, SI. **Percutaneous radiofrequency ablation of small renal cell carcinoma: techniques and outcomes of 24 treatment sessions in 18 consecutive patients**

OBJECTIVE. To retrospectively evaluate the results of percutaneous imaging-guided radiofrequency ablation (RFA) in patients with renal cell carcinoma (RCC). **MATERIALS AND METHODS.** 18 patients were treated with 24 percutaneous RFA sessions over a 4- year period. During 23 sessions, radiofrequency ablation was performed using CT guidance, and one, using sonographic guidance. The average patient age was 76.8 ± 7.6 years (range, 64-89 years), and the average RCC size was 3.3 ± 0.7 cm (range, 2.0-4.5 cm). Follow-up imaging was performed at 3- and 6- month intervals and yearly thereafter. **RESULTS.** RFA was technically successful in all patients. In 4 of the 6 patients residual tumors were successfully re-ablated, while in 2 patients repeated RFAs were not performed at the time of writing this report. After the last imaging control, 17 of 19 tumors were completely necrotic according to the imaging criteria (the secondary clinical success rate was 89.5%). Five patients developed treatment-related complications, including mild pain, large perirenal abscess, mild perirenal hematoma and transient elevation of the white blood cell count. The mean follow-up period was 25.3 ± 16.8 months. **CONCLUSION.** RFA is effective and safe treatment option of exophytic RCC in patients not suitable for surgery due to serious concomitant diseases or advanced age.

MDSS17

Tze Wah, DL Buckley, S Sourbron, DJ Wilson, D Magee, PJ Selby; Leeds, UK. **Quantitative measurement of perfusion of renal cell carcinoma (RCC) pre and post radiofrequency ablation (RFA) with dynamic contrast enhanced MRI (DCE-MRI): a pilot study**

Aim: This study aims to evaluate the feasibility of measuring perfusion in RCC before and after RFA treatment with DCE-MRI and to assess perfusion change within the zone of ablation. **Materials and methods:** Eleven patients undergoing percutaneous RFA of their twelve RCCs were evaluated with DCE-MRI immediately before and at one month post RFA treatment. DCE-MRI was performed with volume acquisition under free breathing. PMI (0.4) software and a maximum slope technique were used to for data analysis. An individual arterial input function was measured in each study. Perfusion of the RCC pre and post RFA was measured as plasma flow in ml/min/ 100ml tissue. **Results** All the DCE-MRI examinations were successfully evaluated with the PMI (0.4) software. Perfusion of the twelve RCCs has decreased significantly ($p < 0.0001$) from a mean of $104 (+/- 43)$ ml/min/100ml pre RFA to $4.1 (+/- 1.2)$ ml/min/100ml post RFA. **Conclusion** It is feasible to measure quantitatively the perfusion of RCC pre and post RFA using DCE-MRI. Perfusion values are significantly decreased in the zone of ablation, suggesting they may be useful for the assessment of treatment effect.



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MDSS18

Steven Kennish, TM Wah, HC Irving, A.Najmaldin; Leeds, UK. **MINI PCNL: Miniature metal access sheath for renal stone extraction in a pediatric population**

Aims: To report our initial experience of MINI percutaneous nephrolithotomy (PCNL) in a paediatric population using the new miniature nephroscope through an 18F metal access sheath for renal stone extraction, and to determine its efficacy and safety. **Patients and methods** All eligible paediatric patients underwent MINI PCNL in our institution from August 2007 to September 2010 and were evaluated. Their demographic details, procedural information and post treatment outcomes were prospectively documented. **Results** A total of 23 MINI PCNLs were performed in 12 patients (9 boys and 3 girls) with ages ranging from 1.6 to 14.6 years (mean 4.76 years). The median stone burden was 3.44 (1.5 to 6.2 cm) and there were 11 staghorn stones. 21 MINI PCNLs were successful in achieving percutaneous access and the primary technical success rate was 91.3%. The mean procedural screening time and total renal extraction period were 4.5 minutes and 109.4 minutes respectively. The primary stone free rate was 83.6%, which increased to 90.5% after treating the residual fragments. Complications included hydro-pneumothorax (n=1), urosepsis (n=2) and chest infection (n=2). **Conclusions** MINI PCNLs using the new miniature nephroscope through an 18F metal access sheath is technically safe and effective in the paediatric population.

MDSS19

Mohamed Abou El-Ghar, Ahmed El-Assmy, Huda Refaie, Tarek El-Diasty; Mansoura, EG. **Imaging of Genito-Urinary Fistula: The Role of MRI**

PURPOSE: To assess the value of magnetic resonance imaging (MRI) in diagnosis of vesicouterine fistula (VUF) **MATERIALS AND METHODS:** Between January 2003 and January 2011; 12 patients with the diagnosis of VUF were surgically managed at our center; among them 8 patients had MRI among their preoperative radiological investigations and those were included in our study. The clinical presentation, radiological investigations and surgical findings of those patients were reviewed. **RESULTS:** The mean age of the patients was 31 years. Seven of the 8 patients came complaining of cyclic hematuria and the remaining patient complained of urinary leakage through the vagina. The etiology of VUF was cesarean section in all patients. The preoperative radiological investigations included conventional cystography in 5 patients, intravenous urography in 2, CT urography in 2 and MRI in 8. The sensitivity of diagnosis for the previous investigation was 40%, 0%, 50% and 100% respectively. **CONCLUSIONS:** The MRI is a simple non invasive technique that has a high reliability in diagnosis of VUF. It should be considered as the radiological method of choice in diagnosis in suspected cases of VUF.

MDSS20

Massimo Valentino, Michele Bertolotto, Pietro Pavlica, Libero Barozzi, Cristina Rossi; Parma, IT. **Real time sonoelastography: testis stiffness measurements in healthy volunteers – preliminary experience**

OBJECTIVE: The purpose of this study was to establish the normal value of testicular stiffness in healthy volunteers using real time sonoelastography (RTE). **SUBJECTS AND METHODS:** Twenty volunteers (mean age 45 years, range 20-81 years) with no history of testicular disease were recruited. The US protocol included a detailed US examination, including color Doppler, of both testes. RTE was performed in all patients and a quantitative measurement of tissue elasticity was obtained. The stiffness of the testis was calculated using an automatic quantification software (QLab – strain quantification system). **RESULTS:** The mean values of stiffness were 0.0605 (SD ± 0.0311) for right testes and 0.0452 (SD ± 0.0194) for left testes. Patients under 40 years of age (n=9) had mean values of stiffness of 0.076 (SD ± 0.038) for right testes and 0.0489 (SD ± 0.0169) for left testes. **CONCLUSION:** These preliminary results in a small number of healthy volunteers show that normal testicular values lie within a relatively small range and do not appear to be significantly correlated with age. Knowledge of normal values could be useful for differentiating focal lesions.

Friday, October 14, 2011

WS1 Renal masses

moderator: Jean-Michel Correas, Paris, FR

a) Imaging of small renal masses in the era of nephron-sparing surgery – **Marrie-France Bellin, Paris, FR**

Learning objectives: To describe the respective roles of imaging studies in the evaluation of small renal masses; To show that imaging has a crucial role in treatment planning for nephron-sparing surgical techniques: 3D imaging provides the urologist with an interactive road map of the relationships among the lesion, the major vessels, and the collecting system; To understand that nephron-sparing techniques are increasingly being used as the treatment of choice in patients with small renal masses that are less than 4 cm and do not involve the renal hilum.

b) Assessing metastatic RCC response to treatment – **Shetal Shah, Cleveland, OH, US**

Learning objectives: 1) Discuss conventional and targeted therapy used to treat RCC; 2) Illustrate imaging changes in RCC treated with targeted therapy/TKI ; 3) Describe current clinical and imaging methods used to assess therapy response in treated RCC

c) RCC genetics and imaging – **Rosaleen Parsons, Philadelphia, PA, US**

Learning objectives: Kidney cancer is a heterogenous disease with unique genetic mutations and outcomes; Kidney cancer is a metabolic disorder; Therapies are being developed targeting the unique biology of the tumors

WS2 The indeterminate adnexal mass

moderator: Teresa Cunha, Lisbon, PT

a) Ultrasound - **Michael Weston, Leeds, UK**

Teaching objectives: Cases will be shown to illustrate the following objectives: 1) To recognise key sonographic features of benign and malignant adnexal disease; 2) To optimise technique and understand pitfalls and problems; 3) To recognise when to use follow up US and when to refer indeterminate masses for MR imaging

b) Indeterminate cystic mass – **Shweta Bhatt, Rochester, NY, US**

Learning objectives: 1. The attendee will be able to understand the various types of benign and malignant cystic adnexal masses; 2. The attendee will be able to learn the imaging findings in all the cystic adnexal masses, and be able to identify and differentiate benign from malignant lesions; 3 The attendee will learn the comparative role of various imaging modalities, with special emphasis on ultrasound and MRI.

c) Indeterminate solid mass – **Isabelle Thomassin-Naggara, Paris, FR**

Learning objectives: To learn how to optimize the MRI protocol and how to improve the characterization of indeterminate complex adnexal masses; To understand the added value of functional sequences (DCE MRI and DWI) in diagnosing solid adnexal masses; To learn a simple practical MRI approach to diagnose solid adnexal masses.

WS3 Newer imaging applications

moderator: Raghu Vikram, Houston, TX, US

a) fMRI of the kidneys, **Lorenzo Mannelli, Seattle, WA, US**

Learning objectives: To illustrate the following fMRI techniques applied to the study of renal function: 1. Diffusion weighted imaging (DWI); 2. Diffusion tensor imaging (DTI); 3. Blood Oxygen Level Dependent (BOLD) MRI; 4. Magnetic resonance elastography (MRE)

b) PET/CT of the female pelvis – **John Strang, Rochester, NY, US**

Learning objectives: 1) Describe uses and pitfalls of PET/CT for evaluation of ovarian carcinoma; 2) Describe uses and pitfalls of PET/CT for evaluation of uterine carcinoma; 3) Describe uses and pitfalls of PET/CT for evaluation of cervical carcinoma

c) Molecular imaging – **Nicolas Grenier, Bordeaux, FR**

Learning objectives: To understand the working mechanism of USPIO probes for visualisation of inflammatory renal diseases; To learn about the future potential of targeting tissue receptors with MRI and US; To learn about potentials of optical imaging techniques in clinical urology

WS4 CT urography

moderator: Anik Sahni, Boston, MA, USA

a) The role of imaging in the evaluation of hematuria – **Brian Herts, Cleveland, OH, US**

Learning objectives: 1) Review the Urological workup for microscopic and gross hematuria; 2) Understand the evolving role of imaging in the work-up of patients with hematuria; 3) Review current and introduce new ideas for triaging patients with hematuria based on age, gender, risk factors and risks of imaging.

b) Technique of CTU - **Aart van der Molen, Leiden, NL**

Learning objectives: 1) To understand the importance of justification of CTU; 2) To understand the details of CTU scanning technique; 3) To get tips for CTU dose reduction

c) CTU of urothelial cancer - **Masahiro Jinzaki, Tokyo, JP**

Learning objectives: 1) MDCT urography is more accurate than excretory urography in the detection and localization of upper urinary tract urothelial carcinoma and should be considered as the initial examination for the evaluation of patients at high risk for upper urinary tract urothelial carcinoma; 2) Excretory phase image of MDCT urography can detect many more bladder cancers than excretory urography, but identify small tumors with limited sensitivity; 3) Early enhanced

images would detect bladder cancers with higher sensitivity than excretory phase images, but some lesions are still missed. Thus, MDCT urography cannot replace cystoscopy at the present time.

LS1a Renal tumor imaging

moderators: Raymond Oyen, Leuven, BE and Neil Wasserman, Minneapolis, MN, US

a) Small renal masses – **Ronald J. Zagoria, Winston-Salem, NC, US**

Learning objectives: 1. To learn optimal imaging parameters to maximize detection of renal cell carcinomas (RCCs); 2. To learn how imaging features can be used to determine histologic subtype of many renal cell carcinomas; 3. To learn how MRI is used to better some presumed Bosniak III tumors. Abstract: Diagnosis of small renal tumors depends greatly on use of optimal imaging parameters. For CT in patients with suspected renal tumors, scanning during the nephrogram phase, also known as the tubular phase, of enhancement or later is essential. Limiting scanning to the portal venous phase of liver enhancement, which corresponds to the cortico-medullary phase of kidney enhancement, will result in under-detection of many small renal tumors. Differentiating RCCs from oncocytomas is not possible with imaging alone. Differentiating RCCs from angiomyolipomas (AMLs) depends on the detection of intratumoral fat, present in 90% of AMLs. For diagnosis of cystic RCCs, use of a classification system like the Bosniak system is very useful. It can be applied to ultrasound, CT and MRI features. Renal tumors with central scars and multiloculated cystic renal tumors have indeterminate imaging features with approximately half being malignant. Diffusion weighted MRI and renal tumor biopsy have improved characterization of renal tumors.

b) Renal tumor biopsy – **Stuart G. Silverman, Boston, MA, US**

With the burgeoning use of cross-sectional imaging and the technological advances, particularly in CT and MRI, the detection of renal masses has increased over the last decade. This has challenged the radiologist to discriminate masses, particularly when they are small, that are benign from those that are malignant. Percutaneous renal mass biopsy has become a fundamental part of the work-up of the renal mass that has undergone a full cross-sectional imaging workup, even those that are small. It is safe, accurate and with advances in interventional and cytology techniques, its role has increased. Biopsy results are used to confirm the diagnosis of renal cell carcinoma, metastases and infections, but we now know that biopsy can be used to diagnose benign masses that in years past underwent unnecessary surgical resection. These advances have stemmed from surgical literature that has shown that a substantial number of benign masses are being resected unnecessarily and biopsy can be used to prevent their resection. The focus of this lecture will review the specific clinical scenarios in which percutaneous renal mass biopsy are indicated today. The learning objectives are: 1) understand why percutaneous biopsy of renal masses is useful in clinical practice; 2) learn the indications of renal mass biopsy and how results can be used to dictate clinical management; 3) understand the role of cytology (including immunocytochemical techniques) and the diagnosis of renal neoplasms.

c) Renal cancer staging and follow-up – **Ulrich Müller-Lisse, Munchen, DE**

The staging and re-staging of renal cell carcinoma (RCC) cancer includes a systematic approach to recognize and describe the local, regional, and distant extent of tumor burden. Staging results determine therapeutic approach, success of individual treatments, and prognosis of individual patients. Evolving diagnostic, therapeutic, and prognostic experience re-defines both staging categories and therapeutic response criteria. The Robson classification of RCC has been left for the TNM classification. Since recent surgical experience suggests that partial nephrectomy can be curative, while it preserves excretory capacity, the TNM classification now reflects tumor sizes amenable to nephron-sparing surgery. Since surgery is currently the only means of curative treatment, lymph node (N-) or distant metastatic (M-) extent of RCC is associated with unfavourable prognosis. However, evolving therapeutic concepts, such as tyrosine kinase inhibitors (TKIs) and tumor anti-angiogenesis factors, demonstrate promising effects on patient survival. Although multidetector-row computed tomography (MDCT) is still the diagnostic mainstay, staging of RCC may involve various other imaging modalities, such as sonography, conventional radiography, bone scintigraphy, MAG-3-clearance scintigraphy, MRI, PET-CT, and, occasionally, imaging-guided biopsy. The increase in speed and range of both CT and MRI suggests that these modalities may soon limit or obviate the need for other imaging modalities in the staging of renal tumors. Transitional cell carcinoma (TCC) of the kidney is a differential diagnosis in patients with solid renal lesions who do not have other primary tumors. Learning objectives: 1) to learn staging classifications for renal cell carcinoma and their respective implications for patient management; 2) to understand the role of imaging in staging renal cell carcinoma and preferred imaging modalities and techniques; 3) to understand limitations of preferred imaging modalities in staging renal cell carcinoma in view of therapeutic strategies

d) Imaging after minimally invasive therapy – **John Leyendecker, Winston-Salem, NC, US**

Learning Objectives: 1. To understand why routine imaging follow-up is necessary after percutaneous thermal ablation; 2. To recognize the normal imaging appearance of a renal tumor that has been treated with thermal ablation; 3. To recognize tumor recurrence and complications on follow-up CT and MRI examinations after thermal ablation. In part due to increasing detection rates of small renal neoplasms with cross-sectional imaging, nephron-sparing techniques are becoming more common for treatment of renal cell carcinoma. Image-guided, percutaneous thermal ablative techniques are gaining in popularity, because they are minimally invasive and can be performed in an outpatient setting. The long-term oncologic efficacy of these techniques is still under investigation, and close imaging surveillance remains a critical component of any renal tumor ablation service. This talk will address imaging follow-up after the two most commonly performed percutaneous thermal ablative techniques for renal cell carcinoma- radiofrequency ablation and

cryoablation. Specifically, the rationale, proposed schedule, and modality choices for imaging follow-up will be discussed. Special attention will be dedicated to normal imaging findings, patterns of recurrence, and complications manifesting on CT and MRI examinations after percutaneous thermal ablation.

LS1b Imaging of the prostate

moderators: Dirk Beyersdorff, Berlin, DE and Valeria Panebianco, Rome, IT

a) Sonographic evaluation in prostatic disorders. **Ahmet T.Turgut, Ankara, TR**

Learning Objectives: 1) To outline the current role of TRUS in the management of prostatic disorders; 2) To overview the classical TRUS characteristics of prostate cancer and benign prostatic diseases; 3) To discuss the impact of evolving TRUS technology on prostate biopsy and future trends in the sampling of the gland. The most common indication for transrectal ultrasonography (TRUS) of the prostate is the evaluation for prostate cancer. However, gray-scale TRUS combined with color and/or power Doppler is not reliable enough for detecting cancerous lesions in the prostate as the newly diagnosed prostate cancer has currently been downstaged in the PSA era resulting in the detection of smaller volume tumors. Nevertheless, contrast-enhanced color Doppler ultrasound and elastography has been claimed to be promising in the detection, grading and staging of the disease. Classically, TRUS-guided prostate biopsy has been accepted as the “gold standard” for the diagnosis of prostate cancer. The procedure involves the sampling of the prostate by extended protocols comprising 10-12 cores from lateral aspect of the peripheral zone as well as the classical sextant sampling sites at the midway between the lateral border and the median plane at the base, mid-gland and apex of the prostate, respectively. Notably, TRUS-guided periprostatic injection of a local anesthetic is efficient for lessening patient discomfort during the prostate biopsy. TRUS-guided biopsies may focus on the sampling of suspicious foci detected by the functional multiparametric MRI. In this regard, labeling the biopsy sites by fused TRUS-MRI images has been reported to give better diagnostic yield. Additionally, TRUS may play a critical role in the management of patients with BPH, cystic and inflammatory prostatic diseases and seminal tract disorders where it enables the calculation of the prostate volume and evaluation for prostate abscess in a patient with inflammatory setting.

b) The role of MRI in the detection and localization of prostate Cancer. **Francois Cornud, Paris, FR**

MRI is more and more often used for PCa detection in patients with a negative series of biopsies and a persistent biological suspicion of PCa. Multiparametric MRI (mp-MRI) increases the accuracy of T2W-Imaging to localise PCa. The most widespread protocol includes dynamic contrast enhanced MRI (DCE-MRI) and diffusion-weighted MRI (DW-MRI) which improve accuracy of T2W-MRI to detect P-Zone cancers with a tumor volume >0.2-0.5cc. DCE-MRI has a high sensitivity but a limited specificity related to a common enhancement of benign P-Zone sextants and of T-Zone BPH nodules. On DW-MRI, PCa shows a significantly lower Apparent Diffusion Coefficient (ADC) value than that of benign prostate tissue which increases the specificity of T2W-MRI. Chronic prostatitis and BPH stromal nodules can have a low ADC value close to that of PCa, but the use of ultra-high b values (b2000) allows for a better differentiation between the three conditions. Significant differences in tumor ADC values are observed between patients with low-risk, and those with higher risk localized P-Zone PCa. Image fusion between MR and TRUS data set is a promising tool to increase the accuracy of targeted TRUS guided biopsies. There is more and evidence that a normal MRI is correlated with absence of cancer or presence of an insignificant tumor. PSA level level and mp-MRI may thus select patients requiring immediate biopsy to detect significant tumors and those in whom biopsy could be deferred and indicated if follow-up shows signs of PSA level progression and/or occurrence of suspicious MRI findings.

c) Structured reporting of multimodality MRI, nodes, and bone. **Jelle Barentsz, Nijmegen, NL**

Multifunctional MRI techniques are increasing being used to address bottlenecks in prostate cancer patient management. These techniques yield qualitative, semi-quantitative and fully quantitative biomarkers that reflect on the underlying biological status of a tumour. These techniques have the potential to provide unique information which can be used for tumour detection in the treated and untreated gland, for predicting future tumour behavior and for monitoring and predicting the likelihood of response to treatment. It is now widely recognized that the multi-parametric MRI approach for evaluating the prostate goes beyond what can be achieved using any single functional MRI technique. If these techniques are to have a role in patient management, effective communication of results by the use of scoring systems, structured reporting and a graphical interface that matches prostate anatomy are key elements. Practical guidelines for integrating multiparametric MRI into clinical practice including new indications, via case examples are presented.

d) MR imaging for predicting therapeutic response to radiation therapy. **Chan Kyo Kim, Seoul, KR**

Radiotherapy for prostate cancer (PC) is one of the commonly used treatment options in patients with early-stage cancer and a long life expectancy. Currently, serum prostate-specific antigen (PSA) is the most widely used test for monitoring the effectiveness of treatment and recurrence of PC during the follow-up period. However, serum PSA monitoring after radiotherapy has been shown to have some limitations: e.g., 1) about one third of patients have a PSA surge and about 50% these patients do not have recurrent cancer, and 2) no pattern of PSA kinetics after radiotherapy has conclusively differentiated between local and distant failure. Thus, there is a need for novel techniques that can provide morphologic and functional information for monitoring therapeutic changes in patients with PC during or after radiotherapy. Furthermore, a reliable and early biomarker of change to therapy would boost the clinical value of therapy because persistent, ineffective treatment is associated with increased toxicity and morbidity, as well as delays in starting alternative, potentially effective treatment. For predicting therapeutic response in PC to radiotherapy, the objectives of this talk are 1) to review potential MRI tools, 2) to illustrate the brief concepts and clinical applications, and 3) to discuss current limitations and future directions.

LS2a Functional imaging in gynaecologic malignancies

moderators: Hedvig Hricak, New York, NY, US and Darcy Wolfman, Washington, DC, US

a) Functional imaging in the urogenital tract: overview and principles – **Harriet Thoeny, Bern, CH**

Learning objectives: 1) To become familiar with the basic principles of Diffusion-weighted MRI; 2) To understand the clinical impact of Diffusion-weighted MRI in the urogenital tract; 3) To become familiar with the clinical potential of arterial spin labeling and Blood-oxygen level dependent MRI in the functional evaluation of the kidneys. CT and MRI provide excellent anatomical images enabling diagnostic work-up of a vast variety of urogenital pathologies. However, these modalities are based on morphological alterations or perfusion changes and are therefore limited to detect diseases leading to changes in size, shape, and MR signal intensity or CT attenuation before or after contrast medium administration. Several new noninvasive MR techniques including Diffusion-weighted MRI (DW-MRI), arterial spin labeling (ASL) and Blood oxygen level dependent (BOLD) MRI have shown promising results providing functional information mainly of the kidneys often preceding morphological changes. DW-MRI shows the Brownian motion in the extracellular extravascular space and is quantified by the Apparent Diffusion Coefficient (ADC) that allows information on diffusion and perfusion provided that these entities can be separated. Thanks to the fact that microstructural changes can be determined by DW-MRI this technique is useful in the detection and characterization of focal lesions as well for the early assessment of treatment response preceding changes in morphology. ASL has shown the potential to quantify the degree of renal artery stenosis noninvasively. BOLD-MRI provides noninvasive information on the renal oxygen content with clinical applications published in patients with acute unilateral ureteral obstruction and in patients with renal allografts for the differentiation between acute rejection and acute tubular necrosis. Future challenges in the functional assessment of the urogenital tract are linked to the integration of multifunctional noninvasive approaches in daily clinical routine.

b) Functional imaging of the uterine malignancies: what it adds – **Evis Sala, Cambridge, UK**

Learning Objectives: 1) To describe the added value of dynamic multiphase contrast-enhanced MRI (DCE-MRI) and diffusion weighed MRI (DW-MRI) in staging of endometrial and cervical cancer; 2) To discuss the added value of DCE-MRI and DW-MRI in detection of tumor recurrence in patients with uterine malignancies; 3) To review the added value of PET/CT in staging and detection of tumor recurrence in patients with uterine malignancies. The results of diagnostic imaging tests frequently change treatment strategies and impact our understanding of disease processes. Functional imaging (i.e. DCE-MRI, DW-MRI and PET-CT) has significantly evolved during the last decade and has now become an important tool in evaluation of the uterine malignancies. It has an added value in characterisation, staging, assessment of treatment response and treatment follow-up of malignant uterine conditions as it provides functional and metabolic information in addition to anatomical information. DCE-MRI in both sagittal and axial (parallel to the short axis of the uterine corpus) planes are routinely used to improve staging accuracy in endometrial cancer. It can also be very useful in the follow-up of patients with cervical cancer as it helps in differentiation of radiation fibrosis from tumour recurrence and it has been shown to predict tumour response to chemo-radiotherapy. DWI may be useful in differentiating benign from malignant endometrial lesions and evaluate tumour aggressiveness. It can also improve staging accuracy in patient with endometrial and cervical carcinoma. DWI is also very useful in detection of recurrent tumour in patients with uterine malignancies. PET-CT improves lymph node staging accuracy in both endometrial and cervical cancer. In patients with advanced cervical cancer, SUV at staging can predict survival. PET-CT is valuable in differentiating tumour recurrence from radiation fibrosis in patients with cervical cancer. It is extremely useful in evaluation of extent of recurrent disease prior to salvage therapy in patients with uterine malignancies.

c) Functional imaging in adnexal disease: what it adds – **Andrea Rockall, London, UK**

The initial diagnosis of an adnexal or ovarian mass differs from many cancers in that biopsy of the suspected mass is not desirable in those cases that have the potential to be treated with primary complete cytoreductive surgery. Biopsy puncture of an intact cystic tumour could result in up-staging of a potentially curable stage 1 ovarian tumour. In these cases, the planning of the primary surgery must be made in the absence of histological confirmation of cancer, with the options varying from cystectomy (for benign lesions) to oncological cytoreductive surgery with complete pelvic clearance (for suspected malignancy). Several characteristics are known to impact on the likelihood that a patient has an ovarian cancer, including the menopausal status of the patient, the ultrasound findings and the plasma CA 125 level. These characteristics can be combined to give a risk of malignancy index (RMI) which can help to direct treatment. However, in patients with a low to intermediate risk of malignancy and a suspicious mass on ultrasound, MRI has been found to increase the specificity for differentiating benign from malignant lesions. The characteristic appearances of a cancer are of a complex cystic and solid lesion with enhancing solid components. However, there is some overlap with certain benign lesions which may contain solid enhancing nodules or papillae. Functional imaging techniques, including quantitative dynamic contrast enhanced (DCE) MRI, diffusion weighted MRI and FDG-PET/CT have been evaluated in this setting, with encouraging results reported using DCE. In patients with suspected disseminated ovarian cancer, functional MRI has been evaluated as a tool to improve triage of patients for primary cytoreductive surgery or primary chemotherapy. FDG-PET/CT has also been reported to be predictive of response to chemotherapy based on changes in the tumour SUV following a single cycle of chemotherapy. These important advances in the imaging of adnexal disease will be presented and the potential role for these new techniques in clinical practice will be discussed.

LS2b Renal imaging in infants and children

moderators: Goran Roić, Zagreb, HR and Michael Riccabona, Graz, AT

a) Ultrasound for pediatric renal imaging – still the major imaging method? **Michael Riccabona, Graz, AT**

Objective: to learn about modern US techniques and applications in the child's urinary tract; to discuss about use and value of modern US in paediatric urology today; to elaborate in the need for knowledge, dedicated training and practical experience in specific and typical paediatric conditions; to offer suggestions on typical imaging algorithms that define the role of US in typical paediatric conditions and queries; to demonstrate some typical examples and images on case base; to discuss restrictions with respect to other imaging options and needs. Conclusion: US is not any longer a orienting and restricted imaging tool, but has matured and today has become the mainstay of paediatric urology. With modern high resolution transducers and techniques, Doppler US, contrast-enhanced US, extended field of view and 3DUS it may diagnostically reliable answer many queries that were not addressable by US some time ago; even if US abilities are restricted the information from US is irreplaceable for indicating, selecting and tailoring additional examinations. Thus adequate equipment and transducers with 24 hour availability must be enabled to grant also children optimal imaging services by properly trained dedicated staff, particularly in the light of the "image gently" campaign.

b) The role of CT in pediatric urology. **Maria Luisa Lobo, Lisbon, PT**

The improved diagnostic yield and the widespread availability of CT have resulted in increasing applications of CT in the evaluation of the urinary tract and it has become an essential imaging tool in adults. Considerably high dose ionizing radiation is the major disadvantage of paediatric CT applications, and as a general rule multiphase acquisitions should be avoided. In addition, "children are not small adults" - there are anatomic and physiologic differences that may interfere and restrict the use of the technique (e.g. lack of intra-abdominal fat and poor discrimination of small structures, immature or impaired renal function) as well as particularities in paediatric pathological conditions and diseases that result in different clinical queries. In children, CT is rarely performed as a first line investigation except for severe (renal) polytrauma. Previous dedicated paediatric urinary tract ultrasound with Doppler, sometimes with additional urinary tract radiography, is essential to decide the need for CT and when feasible MRI should be considered as an alternative. However, there are conditions that justify and require the need of paediatric "uro-CT". Indications, other than trauma, include complicated/ equivocal urolithiasis, complicated infection, tumor assessment and its differential diagnosis and reno-vascular disease. When required, it is mandatory to use paediatric adapted CT protocols (adjusted kilovoltage and milliamperage settings to patient age and size, choose appropriate iodine contrast amount and delay timing, avoid multiphase acquisition) and the technique performed should be tailored to the clinical queries in order to achieve all the diagnostic information needed at the lowest possible radiation burden. Learning objectives: to discuss the indications, restrictions and limitations of CT in paediatric urology; to advise dose reducing strategies and paediatric "uro-CT" protocols; to illustrate paediatric conditions that benefit from CT imaging.

c) Important aspects for performing renal biopsies in children. **Ulrich Willi, Baltimore, MD, US**

abstract not available

d) Imaging in pediatric renal transplantation. **Lil –Sophie Ording, Oslo, NO**

Renal transplantation (rTX) is universally accepted as the therapy of choice in children with end-stage renal disease. Current success in paediatric rTX is attributed to improvements in transplantation technology, immunosuppressive therapy and age-appropriate clinical care. However, these patients are prone to complications from surgery and immunosuppression, and accurate imaging is crucial to implement effective treatment. Various techniques are available for imaging in both pre and post rTX in children, with a clear emphasis on minimal ionising radiation dose. Comprehensive ultrasound with colour Doppler ultrasound is the main modality in paediatric rTX. Rapid development of new MR techniques for evaluation of rTX has taken place over the last years and shows promise for both anatomical and functional imaging.

The choice of imaging modality and the timing of the examination vary between transplant centres and there is little evidence-base for rTX imaging in children. Here, we present the available imaging techniques currently used pre- and post transplant, and how to best use imaging to diagnose and follow up the most common post-operative complications. We present potential guidelines for routine imaging, and discuss possible future techniques such as functional and BOLD MRI. Learning objectives: the role of comprehensive ultrasound and colour Doppler ultrasound examination following renal transplantation; what imaging modalities to use for the most common post transplant complications; to gain some insight into the advantages and limitations of new MR-techniques in paediatric rTX

LS3a Renal emergencies

moderators: Darija Babnik-Peskar, Ljubljana, SL and Robert Mattrey, San Diego, CA, US

a) Trauma – **Jonathan Richenberg, Brighton, UK**

Trauma to the kidneys often occurs as part of more widespread injury following motor vehicle accidents or falls. CT is the key to diagnosing the injuries to the viscera and their blood supply. Many trauma protocols are aimed at looking for liver or splenic damage and can therefore miss or underestimate renal and urothelial damage. This presentation will stress the optimal sequences and parameters for ensuring the renal tract is adequately evaluated following blunt trauma.

The presentation will also emphasise that radiology is no longer merely the key to evaluation, it is, through intervention, becoming crucial in nephron sparing treatment following trauma. By exploring some of the interventions possible, I will suggest how a seamless radiology led trauma service can be established. The presentation will be case based and audience participation will be expected! Learning Points – by the end of the presentation, delegates should: 1) be able to design CT based imaging protocols to best look for renal injuries; 2) be aware that congenital abnormalities (previously discovered or not) can mean that low impact trauma can lead to serious renal injury; 3) be determined to establish a radiology based trauma service raising awareness that interventional radiology can offer equivalent or better outcomes than surgery

b) Acute obstruction – **Sami Moussa, Edinburgh, UK**

Acute Obstruction of the urinary tract is one of the commonest urological emergencies. True acute obstruction is usually caused by stones, blood clot, sloughed renal papilla or fungal ball. Obstruction is more commonly chronic or partial and eventually present with an acute exacerbation. Management: With recent advances in endo-urology and oncology there has been an increasing demand to manage urinary tract obstruction by minimally invasive techniques such percutaneous nephrostomy (PCN) and stent insertion. PCN is more commonly carried out as an emergency or at time as an elective procedure for different indications. The most important indication for nephrostomy drainage in upper tract is **obstruction associated with infection**. The definition of sepsis remains controversial, however accepted criteria include: Temperature more than 38.8 degree C or less than 36 degree C; Tachycardia (heart rate more than 90), Tachypnea (Breathrate more than 20 per minute) or Hypoxia; Leucocytosis more than 12x10 to the par 9; Signs of septic shock (these will require assessment by the anaesthetist on call) but assistance may be required during the procedure. **Anuria:** These patients may have bilateral obstruction or obstruction of a single functioning kidney. **Obstruction with deteriorating renal function:** Manifested by rising urea, potassium and serum creatinine. Obstruction associated with pain which is not controllable with adequate analgesia. **Learning Points:** Understanding the features of obstruction is essential for the selection of appropriate management; in rare situations acute obstruction and renal shutdown is present in the absence of hydronephrosis. This may occur in patients in intensive care situations and a nephrostomy is still indicated. Patient with severe hyperkalemia are at greater risk of cardiac arrhythmia and cardiac arrest during PCN and therefore it is preferable to consider medical treatment or dialysis to bring the hyperkalemia under control before proceeding with nephrostomy; patient with severe co-morbidities and severe sepsis will often require the presence of the anaesthetic team for support even if the procedure is to be carried out under local anaesthesia.

c) Infection – **Parvati Ramchandani, Philadelphia, US**

Learning Objectives: Discuss role of imaging in diagnosis and management of acute and emergent renal infections in adults; Discuss imaging appearance and management of complications of usual renal infections; Discuss imaging appearances of less common renal infections such as granulomatous and parasitic diseases and malakoplakia, as patients may present with acute symptoms to emergency room.

Imaging is usually not indicated in a patient who presents with acute pyelonephritis. However, as many as 1-3% of patients with acute pyelonephritis who present emergently may be clinically misdiagnosed as having acute renal colic (1) and undergo a stone protocol CT to exclude acute renal obstruction due to urolithiasis. In such cases, contrast enhanced CT imaging may become necessary to establish the diagnosis of acute pyelonephritis, and to assess for the development of complications such as renal and perinephric abscess. Renal abscesses complicate pyelonephritis largely in diabetic patients, while perinephric abscesses usually occur in patients with an underlying anatomic renal abnormality such as a calculus or stricture. Inadequate or incomplete courses of antibiotic therapy can also lead to a chronic form of renal abscess, which may produce a diagnostic challenge on imaging. Percutaneous drainage techniques are an important tool in the management of renal and perinephric abscesses. Imaging evaluation for diagnosis and assessment of complications of acute pyelonephritis is best performed with CT or MRI; ultrasound is less sensitive, specific and accurate in both the initial diagnosis as well as for assessment of the complications (2). However, ultrasound is valuable in assessment of pyonephrosis in an obstructed collecting system – low level dependent echoes will be seen in the collecting system. Emergent drainage of the collecting system is necessary in such patients with either the retrograde or percutaneous approach. Gas forming infections can lead to emphysematous pyelitis (gas within the collecting system), which may be associated with urolithiasis or other obstructive lesions. Emphysematous pyelonephritis is a gas forming infection in the renal parenchyma which occurs in diabetic and immune compromised patients and is associated with high morbidity and mortality (3). Familiarity with the imaging appearance of the kidneys in infections such as tuberculosis, schistosomiasis, echinococcosis, and with the sequelae of infections e.g. malakoplakia, and xanthogranulomatous pyelonephritis is important to appropriately diagnose and manage such patients. The management of acute UTI in children will not be addressed in this lecture. In summary, the most important role of imaging of renal infection in the emergent setting is in (1) the prompt diagnosis of life threatening infections such as EPN and pyonephrosis, (2) in assessing the presence and extent of renal abscess and perinephric abscess complicating acute pyelonephritis, to appropriately direct percutaneous or surgical management.

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d) Vascular emergencies – **Tarek El Diasty, Mansoura, EG**

Surgery has traditionally been the definitive form of invasive management for renal vascular injuries. There is growing trend in the use of intraarterial transcatheter techniques as an alternative to surgery in emergency setting. Most of the vascular emergencies result from endourologic interventions, trauma, renal biopsy, local resection of renal tumor, and even nephrostomy. Severe intrarenal and/or retroperitoneal hemorrhage from certain benign or malignant tumors is another type of vascular emergencies. Renal angiogram usually reveals arteriovenous fistula, pseudoaneurysm, or vascular laceration with extravasation of contrast medium. Metallic microcoils are the most often used embolization agent followed by acrylic microspheres, polyvinyl alcohol particles, absolute ethanol, and Gelfoam. Complications include coil migration, incomplete embolization, and groin hematoma. The vast majority of post-infarction symptoms are mild and self-limited. Transcatheter arterial embolization is considered safe and effective and should be chosen as a first-line therapy in renal vascular emergencies due to its low morbidity and limited aggressiveness. **Learning objectives:** 1) To review current indications and techniques of renal arterial embolization (RAE) as minimally invasive management of renal vascular injuries; 2) To evaluate the efficacy and safety of RAE using the different procedures and embolic agents.

LS3b Imaging of scrotum and penis

moderators: Sue Hilton, Philadelphia, PA, US and Pietro Pavlica, Bologna, IT

a) Pearls and pitfalls of testicular torsion. **Vikram Dogra, Rochester, NY, US**

Learning Objectives: 1. Understand the principles of Doppler application in testicular torsion; 2. Describe the key features of testicular torsion; 3. Understand the salient features of partial testicular torsion. Testicular torsion is one of the most common condition to present with acute testicular pain. Its important to make this diagnosis to salvage the testis as the window of time is limited to less than 6 hours. Color flow Doppler is very useful in its evaluation. Complete absence of blood flow within testis usually implies testicular torsion however presence of blood flow within testes does not exclude testicular torsion.

b) MRI of the scrotum **Lejla Aganovic, San Diego, CA, US**

Magnetic resonance imaging is an important imaging technique in the evaluation of scrotal masses, providing a useful adjunct to ultrasonography. Although ultrasound is the modality of choice for initial evaluation of scrotal pathologic conditions because of its wide availability, low cost, and high sensitivity for detection of testicular and paratesticular disease processes, ultrasound findings may occasionally be inconclusive. MR imaging may provide additional information in these cases, often affecting patient management. This lecture reviews and illustrates the MR imaging features of solid extratesticular and intratesticular benign and malignant scrotal tumors, as well as non-neoplastic lesions that can mimic neoplasia. Normal scrotal MR anatomic features and optimal MR imaging technique will also be shown.

c) Has CEUS a role in evaluation of scrotal pathologies? **Massimo Valentino, Parma, IT**

Learning objectives: 1. To evaluate the role of CEUS in the management of acute scrotal diseases 2. To discuss the CEUS findings in main scrotal diseases. High performance contrast specific modes are currently implemented for superficial probes, and an increasing interest is now rising for use of contrast enhanced ultrasound (CEUS) in evaluation of scrotal pathologies. Microbubble contrast agents are highly sensitive in assessing presence or absence of vascular flow. While use in evaluation of patients with high degree torsion has limited clinical application, at least in adults, since this pathological condition can be effectively evaluated with conventional colour Doppler ultrasound alone, diagnosis of segmental testicular infarction and traumatic injuries are improved. Virtually all scrotal tumors are vascularized at CEUS. This technique does not allow differentiation among different histotypes, but provides a useful instrument for the differential diagnosis between tumors with cystic components and complex benign cysts. In inflammation, abscesses are clearly defined, and in trauma patients viability of the testicular parenchyma is assessed. Preliminary investigation suggests use of microbubble contrast agents to evaluate infertile patients with varicocele, and for therapeutic applications. The potential use of CEUS in the diagnosis of low degree testicular torsion is a possible field of application. Noninvasive quantification of testicular blood flow with CEUS can demonstrate difference in the degree of enhancement between the normal and the affected. In epididymo-orchitis CEUS offers a higher definition in the visualization of testicular and epididymal abscesses providing additional clinically useful information in patients with severe inflammation. Finally, CEUS is helpful in categorizing testicular cystic lesions showing the presence of vascular signals. Lack of microbubble enhancement differentiates spontaneous testicular hemorrhage from hypovascular tumors.

d) Imaging of penile trauma. **Michele Bertolotto, Trieste, IT**

Injury to the penis may result from penetrating or nonpenetrating trauma. Nonpenetrating injury to the erect penis can produce albugineal tear, intracavernous hematoma or extraalbugineal hematoma from rupture of the dorsal vessels. Nonpenetrating injury to the flaccid penis usually follows blunt perineal traumas producing extratunical or cavernosal haematomas, or cavernosal artery tear followed by high flow priapism. Differential diagnosis between albugineal tear and other penile injuries which are less relevant from the clinical point of view, such as rupture of the superficial vessels and

hematomas with intact albuginea, must be obtained as soon as possible since early surgical repair of albugineal tears reduces significantly the rate of posttraumatic curvature and fibrosis. US is able to detect the exact site of the tear in most of patients as an interruption of the thin echogenic line of the tunica albuginea. MRI is not always available in emergency. Compared to US, it has the advantage of increased panoramic view and higher contrast resolution between the tunica albuginea and the surrounding structures. It is therefore best suited for imaging penile traumas. Color Doppler US is the imaging modality of choice to evaluate patients with high flow priapism. Focal or diffuse cavernosal fibrosis can be identified with US as echogenic areas in the cavernosal bodies. At MRI fibrotic changes present with low signal intensity on T1 and T2 weighted images. Posttraumatic erectile dysfunction can result from fibrotic changes, nerve and vascular impairment or both. Doppler evaluation of penile vasculature is required in young patients with posttraumatic impotence before surgical revascularization procedures.

SUR Honorary Lecture

moderator: Boris Brkljačić, Zagreb, HR

Hedvig Hricak, New York, NY, US: Imaging in the management of ovarian cancer

Global epidemiological statistics demonstrate that mortality from ovarian cancer has not changed in half a century. Advances in molecular medicine and biomedical imaging are poised to make a difference. In the management of ovarian cancer, cross-sectional imaging is now essential in (1) tumor detection and characterization; (2) treatment selection and planning (identifying difficult-to-reach tumor deposits or inoperable disease for which neoadjuvant chemotherapy is indicated) (3) monitoring treatment response; (4) detecting recurrent disease, and, depending on tumor size and location, choosing between secondary cytoreduction and chemotherapy. Ultrasound is the primary modality for detecting and characterizing adnexal masses. MRI is useful for characterizing sonographically indeterminate adnexal masses, and contrast-enhanced CT is the modality of choice for preoperative staging. FDG PET-CT is valuable for detecting recurrent disease, particularly in the mesentery, bowel serosa and normal-sized lymph nodes. We are witnessing the beginnings of a paradigm shift in cancer care, as treatments are being targeted to the tumor biology and its molecular pathways. The emergence of new molecular imaging tracers and techniques will help bring about further advances in the treatment of ovarian and many other cancers. The opportunities for radiology and nuclear medicine have never been greater.

WS5 Acute female pelvis

moderator: Ana Hrkać-Pustahija, Zagreb, HR

a) Ectopic pregnancy - **Gennaro Restaino, Campobasso, IT**

Learning objectives: To describe epidemiology, pathophysiology and clinical presentation of ectopic pregnancy; To depict clinical and radiological approach to the diagnosis of ectopic pregnancy; To show typical and atypical radiological findings and differential diagnoses of ectopic pregnancy

b) Haemorrhage and torsion - **Deborah Rubens, Rochester, NY, US**

Learning Objectives: Review the imaging appearance and differential diagnosis of hemorrhagic cysts and ovarian torsion; Introduce the 2010 SRU consensus guidelines for management of hemorrhagic cysts; Emphasize the potential pitfalls in the diagnosis of hemorrhagic cysts and ovarian torsion

c) Infection - **Milagros Otero-Garcia, Vigo, ES**

Learning objectives: 1) Recognize the imaging findings commonly seen in early and advanced Pelvic Inflammatory Disease (PID); 2) Identify the various Non-Gynecologic conditions that can present with acute pelvic infection; 3) Discuss the optimal imaging techniques for evaluating patients with acute pelvic infection

WS6 Adrenal imaging

moderator: Sameh Hanna, Cairo, Egypt

a) CT imaging of adrenals - **Ercan Kocakoc, Istanbul, TR**

Learning objectives: 1. To understand adrenal CT protocols; 2. To differentiate adrenal adenomas from other adrenal lesions; 3. To demonstrate the typical CT findings of different benign and malignant adrenal lesions.

b) MR imaging of adrenals – is there a role for DWI and spectroscopy? **Susan Goldman, Sao Paulo, BR**

Learning Objectives: To reinforce the concepts of MRI in the diagnosis of adrenal nodules, to discuss the use of DWI in differentiating lesions (still without a defined role) and show the applicability of the HMRS both in respect of the acquisition technique and mass differentiation.

c) Unusual adrenal masses - **Paul Nikolaidis, Chicago, IL, US**

Learning objectives: 1) While common entities such as adenomas and metastases are frequently encountered on imaging, numerous additional lesions may occur that may pose a diagnostic challenge; 2) To describe features of unusual neoplastic lesions, including collision tumors; 3) To review unusual benign adrenal lesions along with inflammatory and infectious processes, including parasitic and granulomatous diseases.

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GE imagination at work

WS7 Ablations

moderator: Josip Ćurić, Zagreb, HR

a) Renal tumor ablation – **Erick Remer, Cleveland, OH, US**

Learning objectives: Recognize current indications for percutaneous renal tumor ablation.

Understand the steps involved in ablation planning, tumor targeting, and determination of an ablation endpoint. Learn the success rate of ablation and compare it that of surgical options.

b) Imaging findings after renal tumor ablation – **Tze Wah, Leeds, UK**

Learning objectives: 1. To illustrate the imaging appearances of renal tumour after percutaneous tumour ablation (RFA/ Cryo) during longitudinal follow up; 2. To illustrate the salient imaging features on computed tomography and magnetic resonance imaging post renal ablation for RFA and cryoablation; 3. To discuss the potential challenges in diagnosing small residual disease or local recurrence within the zone of ablation on imaging; 4. To highlight the imaging appearances of the complications that we may encounter during follow up of the renal tumour post RFA/ cryoablation

c) Renal tumor ablation: radiofrequency vs. cryoablation – **Ronald J. Zagoria, Winston-Salem, NC, US**

Learning Objectives: 1. To learn the rates of renal tumor eradication for radiofrequency ablation and for cryoablation; 2. To learn the advantages and disadvantages of the two ablation techniques; 3. To learn a reasonable approach to select which ablation technique to use for treatment of renal tumors.

WS8 Pediatric MR urography

moderator: Sabina Prevljak, Sarajevo, BH

a) Lecture : Morphologic and functional aspects of MRU

b) Presentation and discussion of selected cases (**Michel Claudon, Nancy, FR, Jonathan Dillman, Ann Arbor, MI**)

Learning objectives: 1) To learn state-of-the-art noncontrast & postcontrast MR urography (MRU) techniques used to define complex/unusual urinary tract anatomy; 2) To learn a basic standardized approach to reviewing urinary tract anatomy at MRU; 3) To learn the role of MRU in defining complex/ unusual urinary tract anatomy using a case-based approach; 4) To introduce cases illustrating the role of morphologic and functional MRI; 5) To motivate the audience by an interactive approach to cases; 6) To understand the place of uro-MRI compared to the other imaging techniques of the urinary tract

Saturday, October 15, 2011

WS9 Contrast media

moderator: Sachiko T. Cochran, Los Angeles, CA, US

a) Contrast nephrotoxicity. **James Ellis, Ann Arbor, MI, US**

Learning objectives: 1) Weigh the importance of the potential risk factors for contrast nephrotoxicity; 2) Assess the utility of putative measures to reduce contrast nephrotoxicity risk; 3) Appraise the conflicts between controlled and uncontrolled studies of contrast nephrotoxicity following intravenous iodinated contrast administration

b) Corticosteroid premedication (risks and benefits) **Matthew Davenport, Durham, NC, US**

Learning objectives: 1. To understand the arguments for and against corticosteroid prophylaxis in patients at-risk for allergic-like reactions to contrast media; 2. To compare / contrast the ESUR and SUR guidelines regarding corticosteroid prophylaxis; 3. To compare / contrast the allergic-like risks of intravascular contrast media to that of other medications.

c) Nephrogenic systemic fibrosis. **Henrik Thomsen, Copenhagen, DK**

Learning objectives: Imaging of patients with severely reduced renal function in the era of nephrogenic systemic fibrosis and contrast induced nephropathy requires that a lot of factors (inferior imaging, risk of NSF, risk of CIN, acute adverse reactions, radiation, overlooking treatable diseases etc.) are taken into consideration when one advises about the optimal imaging techniques in the single cases. The various factors will be discussed. Long term effects of exposure to gadolinium based contrast agents are gaining increasing interest. Each time a patient is exposed to a gadolinium based agent some free gadolinium is left in the body, mainly in the bone. Most is left after the non-ionic linear chelates and at least 10 times less after macrocyclic agents according to animal studies. Again more is left in patients with severely reduced renal function than in patients with normal renal function. It will be discussed whether the combination severely reduced renal function and nonionic linear agents is the only group at risk for gadolinium toxicity. Another group could be patients with normal renal function receiving multiple injections of a non-ionic linear chelate over a short time. In order to avoid the negative effects of gadolinium in patients with normal and abnormal renal function the best way to go seems to avoid using high risk NSF agents in all patients.

WS10 Using ESUR guidelines for gynaecological imaging

moderator: John Spencer, Leeds, UK

a) Staging cervical cancer – Corine Balleygueir, Paris, FR

Learning objectives: 1) to know the accurate MR protocol for uterine cervical cancer staging; 2) to know FIGO criteria for cervical cancer staging; 3) to know how to write an accurate MRI report for cervical cancer staging.

b) Indeterminate adnexal mass: MR imaging – Karen Kinkel, Geneve, CH

Learning objectives: 1. Understand the role of MRI in the pathway of adnexal mass characterization; 2. Learn to choose the most useful MR sequence according to the dominant signal intensity at T1 and T2 weighted imaging of an adnexal mass; 3. Learn main diagnostic differentials in each of the three main MRI categories of adnexal masses.

c) Staging ovarian cancer – Rosemarie Forstner, Salzburg, AT

Learning objectives: To be familiar with the pathways of spread; To learn the value of the different imaging techniques for staging ovarian cancer; To illustrate the imaging findings of non-optimal respectability; To understand the role of Radiology in treatment decision in ovarian cancer

WS11 Advances in prostate cancer MRI

moderator: Geert Villeirs, Gent, BE

a) Advanced MRI in prostate cancer – Sadhna Verma, Cincinnati, OH, US

Learning objectives: The attendee will be able to understand the metabolic and multiparametric MRI imaging approaches used in patient selection for focal prostate cancer therapy. The attendee will be able to learn the advances in functional MR imaging techniques of MR spectroscopy, diffusion weighted imaging and dynamic contrast enhancement. The attendee will learn the comparative role of various imaging modalities useful in guidance for focal therapy.

b) Molecular imaging – Peter Choyke, Bethesda, MD, US

Learning objectives: 1) Explain the potential role of molecular imaging in prostate cancer; 2) Identify the agents currently being investigated for prostate cancer; 3) Understand potential future advances in molecular imaging

c) MR-guided intervention and biopsy – Jurgen Futterer, Nijmegen, NL

Learning objectives: 1) understand the biopsy procedure in a MR environment; 2) explain the (contra)-indications for MR guided prostate biopsy; 3) understand the potential future role in MR guided therapy

WS12 Bladder

moderator: Vinko Vidjak, Zagreb, HR

a) Imaging and evaluation of bladder cancer – Isaac Francis, Ann Arbor, MI, US

Learning Objectives: 1. Imaging appearances of bladder cancer and correlation with histology; 2. Role of imaging in diagnosis, staging and follow up of bladder cancer; 3. Limitations of imaging in detection and staging of bladder cancer

b) Imaging findings after local therapy for bladder cancer (BCG and after TURBT) – Weining Ma, New York, NY, US

Learning Objectives: Complications associated with intravesical Bacille Calmette-Guerin (BCG) treatment of non-muscle invasive bladder cancer may manifest as focal imaging abnormalities, especially in the genitourinary organs. It is important to recognize these imaging features, as they may mimic primary or metastatic tumors in patients with known bladder cancer. Radiologist should consider this possibility when imaging abnormalities are encountered in bladder cancer patients treated with intravesical BCG so that appropriate management can be administered and unnecessary procedure avoided.

c. Imaging of benign lesions and of neobladders – Vibeke Løgager, Copenhagen, DK

Learning objectives: a) To get to know the benign lesions in the bladder and their clinical and imaging presentation; b) To be presented for the variety of neo bladder designs used after cystectomy.

LS4a Advances in renal mass imaging

moderators: Ranka Štern Padovan, Zagreb, HR and Krishna Shanbhogue, San Antonio, TX, US

a) Advanced renal mass imaging: diffusion and perfusion MRI. Hersh Chandarana, New York, NY, US

Due to lack of exposure to iodinated contrast and ionizing radiation, and superior soft tissue contrast, MRI is being increasingly utilized as a problem solving tool for diagnosis, staging and preoperative planning for renal malignancies. Evolving role of radiologists in assessment of renal lesions includes not only detecting renal lesion and diagnosing this lesion as cancerous or benign, but also to accurately characterize renal cell cancer subtype, assess degree of tumor aggressiveness, assist with treatment planning, and in evaluation of treatment response. To this end diffusion and perfusion MRI may play an increasingly important role. Following subject matter will be briefly discussed: 1) Basic

principles of diffusion (DWI) and perfusion (PWI) MRI; 2) Image acquisition scheme; 3) Qualitative and quantitative image interpretation; 4) Potential clinical applications.

b) Characterization of small renal masses with imaging biomarkers. **Seung Kim, Seoul, KR**

Recent advances in imaging resulted in increased detection of small renal tumors. When a renal tumor is found, one of the most important roles of imaging is differentiation between benign and malignant lesions, mostly renal cell carcinomas (RCCs) and benign tumors such as angiomyolipomas (AMLs) and oncocytomas (OCTs). There are various types of RCCs with clear cell type being the most common, which is usually hypervascular and shows strong heterogeneous contrast enhancement in early-phase CT. Papillary or chromophobe RCCs commonly show more homogeneous and less strong contrast enhancement, and it may be difficult to distinguish from minimal fat AMLs or OCTs. The diagnosis of AML is straightforward if it has gross amount of fat, but not infrequently AML does not have enough fat that can be visible at CT or MRI. There has been number of studies focusing on differentiation between AML with minimal fat and RCC using various techniques and criteria with none of them showed perfect solution. Renal OCT is the second most common benign renal parenchymal tumor after AML. Central stellate scar and spoke-wheel pattern of arterial enhancement have been reported as characteristic imaging findings of OCT, but those findings are usually not seen when OCTs are small. Recently segmental enhancement inversion during corticomedullary and excretory phase CT images was reported as a characteristic enhancement pattern of small OCTs. Still preoperative imaging characterization of small renal parenchymal tumors is an unsolved and ongoing issue, but familiarity with findings at multimodality imaging studies will be helpful.

c) Biopsy of small renal masses. **Francesco M. Danza, Rome, IT**

Two clinical facts have deeply modified the clinical impact of managing renal masses: first the diffusion of new imaging modalities that disclose a wide number of incidentally discovered solid renal nodules. Second the demonstration that focal ablation can be curative in small renal tumors in similar way of the novel enucleating surgical techniques. Another consideration that can contribute to the understanding of the new role of renal masses biopsy is that a consistent proportion of enucleated masses are ultimately diagnosed as benign at pathological analysis (14-20%). Therefore, the management of a small solid renal mass incidentally discovered, nowadays often requires a different diagnostic approach before its surgical removal. In literature we find an increasing number of papers reporting the results with the clinical application of such a philosophy, where the pathological diagnosis becomes the first step of any surgical decision. Once a similar concept is accepted, it is to be defined when (in all or only selected patients) and how to perform the biopsy. Moreover the efficacy and accuracy of such a diagnostic procedure is to be defined: a positive diagnosis has a practical impact on management, but less clear is the significance of a negative or inconclusive result. The lecture will present the largest clinical series evaluating the role of biopsy in clinical management of small renal masses; all the technical considerations will be discussed as well in order to clarify how to obtain better results and minimize complications and seeding. At the end, a flow chart will be proposed to analyze how to manage biopsy results.

d) Follow up after resection of RCC. **Peter Hallscheidt, Heidelberg, DE**

The good results after nephron-sparing surgery in the 1970 and 1980 has led to an increasing number of resections with expected sufficient renal function after nephrectomy (elective indication). The high number of incidentally detected tumors with the possibility of nephron sparing also increases the number of resections. Today nephron-sparing surgery is a standard procedure in for small renal cell carcinomas. In the follow up after resection the knowledge of the surgical procedure is essential to interpret the images and pseudo-tumors do complicate the findings. MRI with multi-planar imaging capabilities and its improved soft tissue contrast has become the standard procedure in the follow up. The aim of this presentation is to understand the different surgical procedures and to be able to evaluate the postoperative findings. Learning points: 1) Surgical techniques in nephron sparing surgery; 2) Imaging protocols; 3) Image findings in follow up

LS4b Pelvic floor imaging

moderators: Carl Sandler, Houston, TX, US and Celine Alt, Heidelberg, DE

a) Introduction, overview, anatomy and MR imaging techniques – **Rania Farouk El Sayed, Cairo, EG**

Classically the "Pelvic Floor" is divided into active and passive supporting elements. The active components refer to the pelvic diaphragm, while the passive elements consist of the pelvic bones and the supporting connective tissue of the pelvis. Pelvic Floor dysfunction (PFD) is a general term that has come to describe a wide variety of clinical conditions, however, the most common and definable conditions encountered by clinicians are stress urinary incontinence (SUI), pelvic organ prolapse (POP) and anal incontinence. Although, multiple factors predispose for PFD, the precise pathological mechanism is poorly understood, and treatment is often started regardless of the specific anatomic lesion involved possibly due to a lack of understanding of normal anatomy and physiology of the pelvic floor. A report from Olsen et al [1] indicated that 29% of the procedures performed for incontinence and prolapse are repeat surgeries, suggesting the need for advances in both diagnosis and management of these disorders. DeLancey [2] emphasized the need for specific tests to pinpoint the specific anatomic defect responsible for PFD in each patient. Static and dynamic Magnetic Resonance (MR) imaging has revolutionized the ability to demonstrate muscular anatomy and movement of visceral organs of pelvic floor. Rather than the classic passive and active supporting elements and based on MR imaging findings the pelvic organ support system was divided into the urethral supporting structures, the vaginal supporting structures and the anal sphincter complex [3]. The learning objectives of this lecture are: to know the normal and abnormal MR imaging features of the pelvic floor supporting system (urethral, vaginal and anal sphincter complex); to learn how to perform the MRI examination and the MRI

techniques; to understand how to read and how to correlate static and dynamic MRI findings in a way that can allow for a defect-specific approach to pelvic floor dysfunction for each patient.

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b) Anterior and middle compartment dysfunction. **Celine Alt, Heidelberg, DE**

Pelvic organ prolapse (POP) is a common disease in older and multiparous women and can strongly affect the quality of life. For therapy-planning, especially before reconstructive surgery, the knowledge of which organ of the entire pelvis is prolapsing and if there is a single or a combined defect is essential. With dynamic MRI, the relationship of the bladder, the urethra, the uterus, the vagina, the pouch of Douglas and the rectum at rest and especially during straining can be assessed. Different kinds of organ prolapse of anterior and middle compartment can be distinguished and will be demonstrated in the session. The measurement method of POP using three anatomical landmarks and one line of reference and the existing grading systems will be discussed. Finally, the clinical relevance of dynamic MRI will be encouraged in a few cases.

Learning Objectives: different kinds of prolapse of the anterior and middle compartment; measurement method of pelvic organ prolapse on MRI; grading of pelvic organ prolapse

c) Posterior compartment disease: evaluating pelvic floor laxity – MR vs defecography – **Marta Heilbrun, Salt Lake City, UT, US**

Learning objectives: 1) Review techniques and patient preparation for dynamic MR defecography; 2) Discuss limitations of MR defecography; 3) Compare dynamic MR to fluoroscopic defecography for the characterization of posterior compartment pelvic floor disorders, using a series of case examples. Posterior pelvic compartment disease is a heterogeneous complex of disorders, from pelvic pain to defecatory dysfunction. For this purpose of this discussion, posterior compartment laxity, as it is manifested in females, will be reviewed. Dynamic MRI defecography has become useful as a comprehensive test for the evaluation of the pelvic floor anatomy and dynamic function. MRI allows relatively noninvasive evaluation of the pelvis in multiple planes with high soft-tissue and temporal resolution. It also avoids ionizing radiation. Optimal performance of MR defecography depends on careful coaching of the patient, thus requiring hands-on involvement by the radiologist. The dynamic portion of the MR examination provides similar information as that provided by fluoroscopic defecography, with a limitation being that the patient is positioned supine, rather than upright on a commode. MR, like fluoroscopic defecography, allows excellent depiction of a number of anatomic disorders of the posterior compartment, including rectoceles, sigmoidoceles, and frank rectal prolapse. A distinct advantage of MR is the excellent depiction of the supporting muscle anatomy and integrity of the pelvic floor. These findings can be very helpful for therapeutic and surgical planning.

d) Posterior compartment disease: fistulas and inflammatory disease – **Atif Zaheer, Baltimore, MD, US**

Magnetic resonance imaging (MRI) has the ability to demonstrate accurately the anatomy of the perianal region as it shows the relationship of fistulas to the pelvic boundaries and adjacent pelvic structures. Accurate preoperative definition has important implications for surgical management and outcomes and understanding the anorectal anatomy and MRI classification of perianal fistulas are important for the practicing radiologist for an objective communication with the referring physician. The primary objectives of the lecture are as follows: 1. understanding the anorectal anatomy and MRI classification of perianal fistulas with case examples; 2. MRI techniques for optimal visualization of the perianal anatomy and pathology; 3. therapeutic and prognostic implications of perianal fistulas based on the MRI classification.

LS5a Upper tract / impaired renal function imaging

moderators: Bruce Mc Clennan, New Haven, CT, US and Roberto Pozzi-Mucelli, Verona, IT

a) CT urography: point - counterpoint – **Nigel C Cowan, Oxford, UK and Richard H. Cohan, Ann Arbor, MI, US**

Objectives: 1) To review techniques that may be used to optimize CT urographic image quality; 2) To recommend approaches to common CT urographic problems; 3) To review current thoughts concerning the utility of CT urography in imaging the upper tracts and bladder; 4) To comment upon potential advantages and disadvantages of dual energy CT urography.

CT urography is now widely used for imaging evaluation of the urinary tract. There continues to be some debate about which CT technique should be used to optimize imaging quality. Nigel currently recommends single bolus, three-phase studies, while Rico still performs split bolus CT (to reduce radiation). Nigel uses a total of 150 mL of contrast media. Rico uses a total of 175 mL of contrast media. Nigel no longer uses furosemide. Rico really never used it. Nigel doesn't administer saline hydration, Rico does. Nigel turns and moves the patient after contrast material injection, but before excretory phase image acquisition. Rico doesn't move the patient, once he or she is on the CT table (because his techs get mad at him when he suggests that this be done and he has problems confronting people). No matter what technique is employed, there are some commonly encountered problems. Some ureteral segments will be unopacified. Nigel and Rico both make assumptions that these unopacified segments can be assumed to be normal, if they are not dilated, although in rare instances this will not be the case. Despite the high sensitivity of CT urography, especially in the upper

tracts, some flat urinary tract tumors (carcinoma in situ) cannot be detected, especially those in the bladder. The bladder is especially difficult to evaluate in patients who have received prior topical treatment for superficial bladder cancer (with BCG and transurethral resection). Additionally, much to Niguel's and Rico's chagrin, some benign findings, including pyeloureteritis cystica and mucous or blood clots, can mimic urothelial neoplasms.

Dual energy CT is being used more widely currently. With dual energy CT urography, the noncontrast series can conceivably be eliminated, leading to a reduction in radiation dose. Unfortunately, artifacts can be created on virtual unenhanced images, leading to false positive and false negative diagnoses of urolithiasis. Finally, with some of the utilized software on fast kVp-switching scanners, technique cannot be varied on obese patients, leading to increased image noise and poor quality scans. Both Niguel and Rico believe that the utility of dual energy CT urography is, at this time, uncertain.

b) MR urography – **Maria Cova, Trieste, IT**

Magnetic Resonance (MR) urography has received a relatively lower attention than multidetector CT (MDCT) urography, being hampered by the low spatial resolution which is crucial for calyceal evaluation and by the requirement of updated MR units. However, excellent contrast resolution and lack of ionizing radiation make MR urography a promising technique for non invasively evaluating the entire urinary tract, especially when ionizing radiation is to be avoided, such as in pediatric or pregnant patients. The MR urographic techniques can be divided into two categories: static-fluid MR urography and excretory MR urography. The static-fluid MR urography utilizes unenhanced, heavily T2-weighted pulse sequences to image the urinary tract. This technique is ideally suited for patients with dilated or obstructed collecting system. In excretory MR urography, intravenous gadolinium is combined with a T1-weighted 3D gradient echo (GRE) sequence. The practicability of excretory MR urography depends on the ability of the kidneys to excrete the intravenously administered gadolinium agent. Administration of low-dose furosemide can improve the quality of excretory MR urography by enhancing urine flow and therefore providing a uniform distribution of the contrast material inside the entire urinary tract. Excretory MR urography provides high quality images of both non-dilated and obstructed collecting systems. The static-fluid MR urography and the excretory MR urography techniques will be addressed. Moreover, capabilities of MR urography will be discussed and comparatively evaluated referring to MDCT urography. Finally, MR urography indications will be suggested.

Take home messages: 1) a precise MR urography technique is needed in order to obtain good quality images; 2) static fluid MR urography is useful for studying patients with dilated or obstructed collecting system, while excretory MR urography provides high quality images of both non-dilated and obstructed collecting system; 3) MR urography might be used in patients with haematuria and low pre-test probability of transitional cell carcinoma

Renal imaging of patients with impaired function

c) Renal masses evaluation US vs. CT vs. MRI vs. PET – **Rosaleen Parsons, Philadelphia, PA, US**

Teaching points: 1. Review the Bosniak Classification for categorization of cystic renal lesions; 2. Have a better knowledge of published data for mass evaluation with US, MRI and PET; 3. Flow chart for the approach to renal mass evaluation in patients who have a contraindication to intravenous contrast. Since its original publication in 1986 the Bosniak classification has been embraced by radiologists and urologists for its ability to categorize renal cystic lesions on CT. Enhancement characteristics of septations and nodules is crucial for assigning a grade to the lesion. However when intravenous contrast cannot be administered renal mass characterization becomes more problematic. The purpose of this lecture is to review other imaging methods that can be used to differentiate benign and malignant renal lesions. The modalities to be discussed include ultrasound with contrast, MRI and PET imaging with novel therapeutic agents. At the conclusion of the lecture attendees should have a better understanding of how indeterminate renal masses are evaluated at our center when CT with contrast is not an option.

d) Renal transplant – **Deborah Baumgarten, Atlanta, GA, US**

Learning Objectives: 1) Understand that the most likely complications following renal transplantation differ based on the timing from transplantation. Knowing when the transplant was placed can narrow the differential diagnosis and guide choice of best imaging; 2) Know when MRI or CT might play a role for renal transplant imaging given that US is the main modality used; 3) Recognize some unusual complications of renal transplantation.

Since the first renal transplantation was performed in 1950, there have been tens of thousands of renal transplants performed in the US; in 2008, 17,413 renal transplants were performed. The graft survival rate at one year (2007-2008 statistics) is 90.8 % for deceased donors and 96.4 % for living donors; patient survival at one year is 95.5% for deceased donors and 98.6% for living donors. Contrast that to 1 year survival rates following the start of dialysis of 79.6%. Obviously increased graft survival translates to increased patient survival and in this endeavor, imaging plays a crucial role.

LS5b Imaging the pregnant patient

moderators: Lorenzo Derchi, Genova, IT and Antonina Bergman, Uppsala, SE

a) Safety issues concerning the use of radiation and contrast media – **Lorenzo Derchi, Genova, IT**

Radiologists tend to be cautious and hesitant about the use of ionizing radiation and contrast media in pregnant patients. The addition of another, smaller patient has to be taken into account, and this heightens the level of anxiety while planning imaging studies. In Europe, this is explicitly stated in the EU directives on Radiation Protection: the benefit/risk evaluation of any medical exposure of a pregnant patient has to consider both mother and fetus. Modalities such as

Ultrasound and MRI should be the preferred examinations for evaluating an acute condition in a pregnant patient. When non-ionizing examinations are not successful or are deemed as inadequate, the lowest possible dose should be employed to gather the necessary information.

It must be remembered that death of the mother is the most common cause of fetal death in emergency situations. This is especially true in severe trauma. Trauma affects 7% of all pregnancies and requires admission in 4 of 1000 pregnancies. Fetal mortality has been quoted as high as 61% in major trauma and 80% if maternal shock is present. Management strategies in acute maternal trauma must focus first on a thorough assessment of the mother, and no examination should be withheld when an important clinical diagnosis is under consideration. A coordinated team effort that includes the radiologist is essential to ensure optimal maternal and fetal outcomes. It must be stated that a written policy on how to deal with pregnant or possibly pregnant patients has to be implemented in radiology departments, and informed consent from the mother is suggested before taking any exam which uses ionizing radiations. Additional considerations include exposure of pregnant patients to contrast agents (CA). Intravenous iodinate CA cross the human placenta and enter the fetus, and there is concern about damage to the fetal thyroid related to iodine uptake. The ESUR guidelines indicate thyroid function should be checked in the first days of life if the mother received iodinate CA during pregnancy. As regards Gd-CA, animal studies do not indicate direct or indirect harmful effects with respect to reproductive toxicity. However, Gd-CA use during pregnancy is not recommended due to the possibility of Gd accumulation in human tissues. They should not be used in pregnancy unless there is clear indication basing on clinical condition of the woman; the least possible dose should be employed.

b) Maternal problems: uses and limitations of ultrasound - **Jo McHugo, Birmingham, UK**

Learning Objectives: To understand the physiological changes that occur in pregnancy and how these impact on imaging with ultrasound; To learn how to modify ultrasound techniques with advancing gestation; To understand the limitations of ultrasound and when to perform alternative imaging.

Across Europe there is a general trend for reduced birth rate but these pregnancies are occurring in older women. This fact is increasing the risk of maternal complications. The normal physiological changes that occur in pregnancy increase the risks of certain diseases e.g. venous thrombosis; pregnancy may unmask underlying disease e.g. renal or may just be co-incident in time. All of these diseases and these symptoms require appropriate imaging. Therefore the radiologist needs to have an understanding of maternal diseases and understand an appropriate imaging strategy. This lecture will aim to outline a structured approach to imaging using ultrasound.

c) MR imaging of the placenta - **Gabriele Masselli, Rome, IT**

Learning Objectives: 1) Learn how to perform and to read a MR examination to study the placenta; 2) Identify anomalies of placental implantation, including the various forms of placenta previa and placenta accrete; 3) Discuss the added value of MRI over US in the evaluation of invasive placental processes, including placenta accreta and placental abruption. The placenta is often overlooked in the routine evaluation of a normal gestation, receiving attention only when an abnormality is detected. Although uncommon, abnormalities of the placenta are important to recognize owing to the potential for maternal and fetal morbidity and mortality. Pathologic conditions of the placenta include placental causes of hemorrhage, gestational trophoblastic disease, retained products of conception, nontrophoblastic placental tumors, metastases, and cystic lesions. MRI can be of added diagnostic value when further characterization is required, particularly in the setting of invasive placental processes such as placenta accreta, placental abruption and gestational trophoblastic disease. Antepartum hemorrhage (vaginal bleeding between 20 weeks gestation and delivery) remains an important cause of maternal and fetal morbidity and mortality. Placenta previa and placental abruption account for more than one-half of cases of antepartum hemorrhage and are increasing in prevalence as the rate of cesarean section increases. MR imaging might well have a pivotal role in the diagnosis of intrauterine bleeding thanks to its high spatial resolution and to the known high sensitivity and specificity in distinguishing blood from other fluid collections.

d) Maternal abdominal pain: MR imaging - **Michele Brown, San Diego, CA, US**

Pregnant patients with abdominal pain present a unique diagnostic challenge to the clinician and to the radiologist. There are numerous potential causes of pain and many present in an atypical fashion during pregnancy. Ultrasound is the initial imaging modality of choice but may occasionally be inconclusive. CT should be avoided if possible due to harmful effects of radiation on the fetus. For cases in which ultrasound is nondiagnostic, magnetic resonance (MR) imaging can be used to evaluate the maternal abdomen.

Learning objectives: Upon completion of this presentation, the audience member will be able to: 1) Describe indications for MR imaging in pregnant patients with abdominal pain; 2) Generate appropriate MR protocols for the evaluation of abdominal pain in pregnancy; 3) Identify specific causes of maternal abdominal pain based on MR imaging appearance.

ESGAR – ESUR Joint Session - GU / GI emergency radiology

moderators: Bernd Hamm, Berlin, DE and Yves Menu, Paris, FR

a) Emergencies of the upper abdomen- **Christoph Zech, Munich, DE**

Learning objectives: To review diseases leading to emergencies of upper abdominal organs; To learn how to protocol MDCT and MRCP examinations of patients with upper abdominal emergencies; To be familiar with typical imaging findings of these pathologies in MDCT and MRCP. Emergencies of the upper abdominal organs are a frequent medical event. They comprise usually inflammatory, vascular or traumatic events of the liver, the biliary system, the pancreas and the spleen. Proper treatment of the different pathological events requires an exact diagnosis

and a precise description of the extent of the disease. Usually ultrasound is the first diagnostic step in all patients with abdominal emergencies. For further evaluation computed tomography (CT) will be the method of choice as it is fast, robust and widely available. However, for the depiction of the biliary tree magnetic resonance imaging (MRI) offers an excellent and fast non-invasive evaluation of the biliary system with the so-called MRCP. Invasive diagnostic procedures like digital subtraction angiography (DSA) or invasive cholangiography (either percutaneous or endoscopic) are usually reserved for special cases or when minimal-invasive therapeutic procedures are necessary. In this lecture the typical diseases leading to emergencies of the upper abdominal organs are presented and typical findings in CT and MRCP examinations are shown.

b) Emergencies of the upper urinary tract - **Gertraud Heinz-Peer, Vienna, AT**

Emergencies of the upper urinary tract include a wide spectrum of diseases. Of all the acute conditions, obstruction is by far the most common. Obstruction can be caused by anatomy (e.g. tumor, retroperitoneal fibrosis), of chemistry (gout, calculous disease) or of function (posterior urethral valves, high-pressure chronic retention of urine). Traumatic emergencies of renal arteries are more common compared to non-traumatic ones which can be caused by rupture of renal artery aneurysms, embolic occlusion, and spontaneous dissection. The latter one is more common in abdominal blunt trauma and with type B aortic dissections. Renal vein thrombosis is most commonly caused by renal cell cancers, in rare cases the underlying pathology may be ascending thrombosis of left ovarian or testicular vein. Also pathologies of the coagulation system may lead to renal vein thrombosis. Renal bleeding may be observed in penetrating and blunt trauma as well as in spontaneously ruptured giant cysts, angiomyolipomas, and renal tumors. Last but not least emergencies also include severe urinary tract infections and complications of inflammatory diseases like intra-, peri-, and pararenal abscesses. In this talk appropriate imaging techniques and imaging findings of the various emergency situations of the upper urinary tract will be presented. Additionally interventional procedures will be addressed.

Learning objectives: to overview the spectrum of upper urinary tract emergencies; to use appropriate imaging techniques; how to manage acute conditions of the upper urinary tract

c) Emergencies of the lower abdomen - **Steve Halligan, London, UK**

Lower abdominal pain in the context of an acute abdomen is a common clinical scenario that most radiologists have to deal with at some point. Although plain abdominal radiography has a role, as does ultrasound, CT (when available) is undeniably the modality now found most useful overall by clinicians and radiologists alike. The list of potential differential diagnoses for lower abdominal pain arising from the bowel is wide and inevitably includes appendicitis and other commonly encountered conditions including diverticulitis, large bowel obstruction (whether due to adenocarcinoma or other non-malignant causes), and the colitides (including ischaemia, inflammatory types, and infective causes). Occasionally, other rarer pathologies underpin symptoms, examples of which are epiploic appendagitis and segmental infarction. Distinguishing these conditions from each other and also from gynaecological (e.g. ovarian torsion) and urinary tract pathologies (e.g. urolithiasis) is challenging for the clinician, even when armed with abdominal radiography. This lecture will focus on the commonly encountered CT features of lower abdominal colonic disease that help distinguish these pathologies from one another and so help the radiologist clinch the diagnosis. Attention will also be drawn to those areas where typical imaging features overlap with the result that a confident diagnosis is occasionally very difficult or even impossible (e.g. the distinction between a diverticular abscess and a perforated carcinoma).

d) MR imaging of female pelvic emergencies - **John Spencer, Leeds, UK**

MR imaging although now widely available as an elective examination of the genitourinary tract is not so widely available for emergency use. There are, however, a number of specific applications where it can provide information unobtainable by other non-invasive means. It should be used at an early stage in the investigation of unremitting maternal loin pain in pregnancy, being able to distinguish physiological from calculous obstruction. It is a valuable adjunct to US and CT for assessment of the indeterminate 'hot' adnexal mass as there are key distinguishing features for adnexal haemorrhage, ovarian torsion, giant ovarian oedema and complex pelvic infection. When a woman presents with acute vaginal bleeding or discharge with or without pain a gynaecological cause is suspected and US is usually the initial imaging test. When the bleeding or infection is entrapped or spreads internally the clinical presentation mimics an acute GI problem and CT is usually chosen. Cases shown will illustrate the clarity with which MR imaging reveals the diagnosis.

Key references

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ESUR guidelines

moderators: Sameh Morcos, Sheffield, UK and Gertraud Heinz-Peer, Vienna, AT

a) Pelvic imaging: **Karen Kinkel, Geneva, CH**

The Female Imaging Sub-Committee of the European Society of Urogenital Radiology (ESUR) has finalized guidelines for endometrial cancer staging (1) characterization of the sonographically indeterminate adnexal mass (2), ovarian cancer

staging and follow-up (3) and cervical cancer staging (4). The development of guidelines is based on expert opinion among ESUR members collected through questionnaires, literature analysis and subsequent discussion. A short summary of each finalized guideline is presented below.

MRI is the best imaging modality to diagnose pre-operatively deep myometrial or cervical stroma invasion by endometrial cancer. Indications for MRI staging of endometrial cancer are histological confirmed cancer in a women requiring local staging to plan further management. At least two high spatial resolution T2-weighted sequences are performed in the sagittal and axial oblique (perpendicular to the uterine cavity) planes. Technical parameters and interpretation criteria are detailed in the guidelines. A single 3D acquisition technique at about 2min30 after contrast injection is a good alternative to dynamic imaging due to optimal tumor-myometrium contrast and thin slice sections. Adnexal masses can be classified as indeterminate at ultrasound due to an uncertain origin or the unclear benign versus malignant nature of the mass. **To characterize an indeterminate ovarian mass with MRI an algorithmic approach has been developed** by the group: The minimal technical protocol should include a sagittal T2-weighted sequence and a pair of T1 and T2-weighted sequence in the same imaging plane (axial or coronal oblique) and thickness. The decision tree divides masses into three categories according to their dominant signal intensity at T1 and T2-weighted images: T1 bright masses, T2 dark masses and complex cystic-solid masses.

Computed tomography with coverage of the base of the lungs to the inguinal region is regarded as the imaging technique of choice for preoperative staging of ovarian cancer. Critical diagnostic criteria are presented and the basis for a structured report for preoperative staging is outlined. Following primary treatment for ovarian cancer, clinical assessment and CA-125 are routinely used to monitor patients. For suspected recurrence, CT remains the imaging modality of choice, with positron emission tomography (PET)/CT emerging as the optimal imaging technique for suspected recurrence, particularly in patients with negative CT or MRI.

For staging cervical cancer MRI should include at least two T2-weighted sequences in sagittal, axial oblique or coronal oblique orientation (short and long axis of the uterine cervix) of the pelvic content. Axial T1-weighted sequence is useful to detect suspicious pelvic and abdominal lymph nodes, and images from symphysis to the left renal vein are required. The intravenous administration of Gadolinium-chelates is optional but is often required for small lesions (<2 cm) and for follow-up after treatment. Diffusion-weighted sequences are optional but are recommended to help evaluate lymph nodes and to detect a residual lesion after chemoradiotherapy.

References:

1. Staging of endometrial cancer with MRI: guidelines of the European Society of Urogenital Imaging. Kinkel K, Forstner R, Danza FM, Oleaga L, Cunha TM, Bergman A, Barentsz JO, Balleyguier C, Brkljacic B, Spencer JA; European Society of Urogenital Imaging. Eur Radiol. 2009 Jul; 19(7):1565-74.
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b) Updated report and new proposals for imaging recommendations from the Pediatric Uroradiology Working Group.

Michael Riccabona, Graz, AT

Objective: To present two new proposals of the work group. To discuss the updated proposals based on feedback from the preliminary presentation at the 2011 ESPR task force meeting in London before being finalised and then eventually published. To report the groups' activities concerning promotion of US-CM licensing for paediatric use. To summarize the groups activities during the last year, including publication of the 2010 recommendations.

Content: *Imaging in paediatric cystic renal disease* (F. Avni, M. Riccabona) - how to classify cystic renal disease based on new theoretical insights, and demonstrate the respective imaging appearance. An algorithm could be potentially useful to differentiate between the different diseases and syndromes. This decision tree is based on previous history, specificity of US appearances or the presence of poly-malformation syndromes.

Imaging in childhood renal transplantation (B. Damasio, LS Ording-Müeller, M. Riccabona, U. Willi) proposition to streamline imaging in childhood renal transplantation via a minimum standardised imaging algorithm and protocol for the various stages and clinical scenarios during and after childhood renal transplantation.

Conclusion and summary: These proposals as well as all the already existing ones are "eminent-" and consensus based recommendations, as little hard evidence is available for paediatric imaging. They will have to be updated according to new knowledge; hopefully this more unified imaging approach will help to gain deeper insight and to produce more evidence in the future.

c) Prostate: **Jelle Barentsz, Nijmegen, NL**

This presentation provides guidelines for prostate MRI assessed by prostate MRI-experts from the European Society of Urogenital Radiology (ESUR), based on literature evidence and consensus expert opinion. A compromise, reflected by 'minimal' and 'optimal' requirements has been made. The proposed technique for the "detection", "staging" and "node and bone" protocols are shown. The use of endorectal coil versus pelvic phased array coil, and 1.5 versus 3T will be discussed. Clinical indications are provided, and finally the ESUR PI-RADS classification will be presented.



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d) Contrast media - CIN: **Fulvio Stacul, Trieste, IT**

Learning Objectives: 1. To learn risk factors of contrast media induced nephropathy; 2. To understand the significance of contrast media choice, amount and administration route; 3. To become familiar with measures for preventing CIN.

The Contrast Media Safety Committee of the European Society of Urogenital Radiology has updated its 1999 guidelines on contrast medium-induced nephropathy (CIN). Topics reviewed include the definition of CIN, the choice of contrast medium, the prophylactic measures used to reduce the incidence of CIN, and the management of patients receiving metformin. The definition of CIN is a complex topic and understanding of it continues to evolve. At present the CMSC considers appropriate to keep the definition agreed in 1999. In the previous guideline a number of risk factors were listed (raised S-creatinine levels, particularly secondary to diabetic nephropathy, dehydration, congestive heart failure, age over 70 years, concurrent administration of nephrotoxic drugs). The significance of these risk factors has been confirmed and new risk factors were added. The CMSC agreed that the risk of CIN is significantly lower following intravenous CM administration and concluded that patients referred for enhanced CT are genuinely at risk if they have an eGFR < 45 ml/min/1.73m². The previous CMSC guideline suggested the use of low or iso-osmolar CM in patients with risk factors for CIN and the CMSC considered that this previous guideline should not be changed. The CMSC considered that there is enough evidence to recommend that either volume expansion with isotonic saline or sodium bicarbonate may be used for preventing CIN in at risk patients, while the efficacy of NAC and other drugs in reducing the incidence of CIN remains unproven. Finally the CMSC agreed that patients with eGFR (equal or greater than) 60 ml/min/1.73 m² receiving CM can continue metformin normally.

Sunday, October 16, 2011

SS Kidney I

Moderator: Ranka Štern-Padovan; Zagreb, HR

SS1: Kim See Hyung, Kim Young Whan, Lee Hee Jung; Daegu, KR. Serious acute pyelonephritis: a predictive score for evaluation of deterioration of treatment based clinical and radiologic findings using CT

The purpose of this study was to develop simple score for assisting in the diagnosis of deterioration of treatment in patients with serious APN. Using data from retrospective cohort of 150 patients with our investigation, we developed score based on logistic regression after jackknife procedure. We validated the score in prospective cohort of 35 patients. Seven criteria were independently associated with our investigation: WBC count [adjusted odds ratio (aOR), 4.5; 95% confidence interval (95% CI), 1.2-22.5], fever (aOR, 5.4; 95% CI, 1.4-24.8), global enlargement (aOR, 7.9; 95% CI, 2.1-31.8), pelvicalyceal effacement and thickening (aOR, 9.6; 95% CI, 2.5-45.2), poor excretion of contrast (aOR, 10.3; 95% CI, 2.7-38.5), abscess (aOR, 18.8; 95% CI, 4.3-76.5) and pyonephrosis (aOR, 15.6; 95% CI, 3.2-67.6). The score was based on seven criteria. Low-risk and high-risk groups were derived from values of the score [probability of seriousness, 3.7% (95% CI, 0-7.8) and 69% (95% CI, 53-84)]. Application of these criteria to prospective cohort confirmed diagnostic accuracy of score [probability of seriousness, 0% (95% CI, 0-16) and 75% (95% CI, 26-100) in the low-risk and high-risk groups]. This score may prove useful for diagnosing patients with serious APN with deterioration of treatment.

SS2: Teck Chin, J.Belfield; Liverpool, UK. CTKUB Requests in Acute Renal Colic – Does Side Matter?

Purpose: To evaluate whether CTKUB requests cards mention the side of the patient's pain in the clinical presentation of acute renal colic. **Materials/Methods:** A retrospective analysis was performed looking at all CTKUB requests and findings between January and March 2011. In presentations of acute renal colic, request cards and reports were examined to identify the side of pain and the correlating radiological findings. A standard of 100% was set as such information is important in establishing a firm diagnosis, and the lack of it could impact on the radiologist's interpretation of the scan. **Results:** 138 CTKUB scans were performed during this period of which 102 were undertaken for acute renal colic. 12/102 (11.8%) did not mention the side of the patient's pain on the request card. Of these, 2 had obstructive renal calculi, 3 had renal calculi of doubtful significance and 7 scans had a normal urinary tract system. **Conclusion:** 11.8% of CTKUB requests cards did not have the complete clinical history in patients with acute renal colic. The lack of such information can potentially hinder the interpretation of the scan especially in cases where small or non-obstructive renal calculi are present.

SS3: Aniket Tavare; Leeds, UK. An audit of imaging of renal colic in the emergency department: role of plain abdominal radiography

Due to its high sensitivity and specificity, current guidelines suggest non-contrast CT-KUB should be used as the first-line imaging modality of suspected renal colic (RC). However classical teaching suggests up to 90% of renal tract calculi are visible on plain abdominal radiographs (AXR). An audit was performed to assess the choice of imaging used in all first presentations of RC to Hammar Smith Hospital Emergency Department (a large UK university teaching hospital) over a four-month period. 49 cases where RC was suspected were analysed. 35 (71%) patients received CTKUB. 31 (91%) had this done within 24 hours. Calculi were detected in 18 (51%). The calculi detected ranged in size from 2-14mm. No alternative diagnoses were made from CTKUB. Of note 40 patients had abdominal X-ray (AXR) performed as a first-line investigation. This had a poor yield, detecting stones in only six patients out of the 18 (33%). Five out of these six patients subsequently required CTKUB anyway. In conclusion AXR display low diagnostic sensitivity in RC and do not change management (a 'negative' AXR with a strong clinical suspicion of RC necessitates CTKUB; similarly a 'positive' AXR dictates need for CTKUB to formally assess size and position of stones).

SS4: Rosemarie Thomas, V. Shuen, T. Wells, S. Freeman; Plymouth, UK. Advantages of adopting digital tomosynthesis in intravenous urograms

Aim: Digital tomosynthesis acquires multiple low dose projections during a single tomography sweep which are then reconstructed to high resolution images of varying depth. The aim of this study is to assess the diagnostic quality and the radiation dose in imaging the kidneys with intravenous urogram (IVU) using digital tomosynthesis when compared to the traditional IVU studies. **Methods:** 100 consecutive traditional IVUs were retrospectively compared with 101 IVUs acquired by digital tomosynthesis. Scores were given for the visualisation of the renal outline and collecting system, the presence of renal cysts or mass and the diagnostic quality of the images. The radiation doses were analysed. **Results:** The diagnostic quality of traditional IVUs compared to IVUs with digital tomosynthesis was 46.5% and 95.5% respectively. There was a significant difference with a p-value of < 0.001 . The radiation dose between the two was also significant, with a mean reduction of 56% when using digital tomosynthesis. **Conclusion:** Digital tomosynthesis offers a significant increase in the diagnostic quality in assessing renal pathology at a significant dose reduction when compared to traditional IVUs. It also offers ease and speed in acquiring images. For the above reasons, digital tomosynthesis should be adopted when performing IVUs.

SS5: Ana Šverko Peternac, M. V. Løgager, T Lenicek, B Kusic, Z Macak Safranko, S Sobocanec, A Saric; Zagreb, HR. Superoxide dismutase and cytochrome P450 isoforms might be associated with higher risk of renal cell carcinoma in male patients

The incidence of renal cell carcinoma (RCC) is two times higher in men than in woman. The aim of this study was to determine whether oxidant/antioxidant profile of RCC, adjacent to tumor and nontumor tissue differs in male and female patients and whether gender-related difference in copper zinc superoxide dismutase (CuZnSOD), manganese superoxide dismutase (MnSOD) and several P450 isoforms between RCC and nontumor tissue exists. Thirty patients with histologically proven RCC were included in the study. The oxidant/antioxidant profile was assessed by measuring concentration of thiobarbituric acid reactive substances and malondialdehyde (indicators of lipid peroxidation, LPO) and activity of key antioxidant enzymes: catalase (CAT), superoxide dismutase (SOD) and glutathione peroxidase (GPx). The expression of genes was reviewed by polymerase chain reaction. Significantly higher LPO in RCC compared to nontumor tissue was demonstrated in male patients. CAT activity was decreased in RCC of both sexes, SOD activity was not changed and GPx activity was decreased in RCC of male patients. Gender-related difference in gene expression for MnSOD, CuZnSOD, CYP2E1 and CYP2C19 was demonstrated, as well as suppression of CYP2D6 mRNA in both sexes. Taken together, these parameters might be responsible for the higher risk of RCC in men than in woman.

SS6: Lutfi Kurban, Alireza Vosough, Bhaskar Somani, Deepak Prasad; Aberdeen, UK. Pathological nature of renal tumours-Does size matter?

Introduction Most solid renal masses are malignant. It has been suggested that small renal masses (SRM) have higher chance of being benign (up to 30%). Hence, there is a new emerging indication to biopsy these small tumours. Our aim is to examine the relationship between the size and nature of renal masses. **Materials and methods** Retrospectively, we reviewed 320 nephrectomies between 2000 and 2008. Final pathology was correlated with tumour size. 3 cm cut off point was used to define small and large tumours. **Results & discussion** Of 286 large tumours only 16 were benign (5%) while of the 34 small masses, 4 were benign (12%). Oncocytomas constituted 75% of small and 84% of large benign tumours. Oncocytomas are normally surgically removed due to their uncertain natural history. Moreover, obtaining a biopsy proven oncocytoma does not secure a benign diagnosis as co-existing chromophobe carcinoma is seen in 10-15% of cases. Renal biopsy may help avoid surgery in surgically high risk patients or if radiological appearances are suggestive of a benign lesion such as a lipid poor angiomyolipoma. **Conclusion** We demonstrated an increase likelihood of benignity in SRM, majority being oncocytomas. Biopsy of SRM may have a role in selected cases.

SS7: Ole Graumann, Susanne Sloth Othser, Palle Jörn Sloth Othser; Fredericia, DK. Evaluation of Bosniak category IIF complex renal cysts

Introduction The main purpose of categorizing renal cysts is to diagnose/exclude potential malignancy. Bosniak Category IIF has been introduced for those moderately complex renal cysts that cannot be clearly categorized as category II or III and therefore need follow-up studies. The aim of this study was to investigate the clinical usefulness of Bosniak category IIF in evaluating moderately complex renal cysts. **Materials and Methods** 8402 CT studies from 2003-2009 were evaluated by two radiologists and clinical outcome registered prospectively. 570 patients were diagnosed with complex renal cysts according to the Bosniak classification. **Results** 44 Bosniak IIF lesions were found. Mean follow-up period was 2.5 years. Four lesions were upgraded. Pathology of two lesions showed papillary and clear cell renal cancer. Due to comorbidity the other two patients continued follow-up CT. 8 lesions with follow-up periods > 5 years had no change and were downgraded. **Conclusion** By critically evaluating the outcome of complex renal cysts by usage of the Bosniak classification, we found that out of 44 Bosniak category IIF lesions only four lesions (11%) were upgraded within a mean follow-up period of 2.5 years. The use of Bosniak category IIF seems clinically applicable, resulting in an overall nephron-sparing approach to complex renal cysts.

SS8: Mohamed ElAzab, Mohamed Abouelata, Talal Amer, Amal Sacrana, Tarek El Diasty; Mansoura, EG. Role of multidetector CT in evaluation of patients with obstructed urinary tract

OBJECTIVE: To assess the value of multidetector CT as a single imaging modality in evaluation of patients of urinary obstruction. **SUBJECTS & METHODS:** Study included 177 patients with urinary obstruction as primarily diagnosed by US. All patients examined by using MDCT urographic protocol with images were obtained during the unenhanced, arterial,

nephrographic and excretory phases. **RESULTS:** Urolithiasis has been identified by MDCT urography with sensitivity 100% regardless their site and size with highest detection rates were by CPR&MIP images. Congenital anomalies of obstructed urinary tracts were diagnosed with sensitivity and overall accuracy of 100%. The sensitivity for detection of urinary tumours was 92.88% and a positive predictive value was 90.7%. The sensitivity of MDCT for detection of inflammatory causes of urinary obstruction was 75% and positive predictive value was 80%. The sensitivity for detection of calculi obstruction was 100% and that of noncalculi obstruction was 94.4% with overall sensitivity 96.05% for detection of causes of urinary obstruction and the overall accuracy was 92.09%. **CONCLUSION:** Multidetector CT is highly sensitive for detecting the different causes of urinary obstruction and may serve as primary imaging modality of choice to evaluate patients with obstructive uropathy.

SS9: Seong Su Hwang, Soo Youn Park, Young Mi Ku. Gyeonggi-do, KR. Frequency of symptomatic episodes of incidentally detected calcified caliceal stones during two year CT follow-up

PURPOSE We investigated clinical course of incidentally detected asymptomatic calcified renal caliceal stones on CT **METHOD AND MATERIALS** We performed a retrospective evaluation of 135 patients average age 56.7 years who were followed for a mean of 21.7 months for asymptomatic calcified renal caliceal stones detected on abdominal CT. All patient performed follow up CT and were compared with initial CT to determine the change of size, number and location of renal calculi. During follow up period, ureteral stone obstruction and hematuria are recorded. **RESULTS** Mean calcified stone diameter was 4.5mm; 54% were lower-pole stones, and 33.7% had multiple calcified calculi. Overall, 39.2% (53/135) of patients experienced change in size and location of stone and development of pain or hematuria with 9.6% (13/135) requiring symptomatic treatment due to migration of caliceal stone in the ureter. Development of pain or hematuria associated with caliceal stone was more common in larger stone more than 3mm (61%) and in lower pole stone (64%). **CONCLUSION** Incidentally detected calcified caliceal stones causing ureteral stone symptom was not infrequently occurred. Size and location of caliceal stone are positively related with development ureteral stone obstruction

SS10: Ole Graumann, Susanne S. Osther, Diana Spasojevic, Palle J. S. Osther; Fredericia, DK. Can the CT Planning Image determine whether a kidney stone is radiopaque on a plain KUB?

Introduction: CT Planning Image (CTI) has been used as a guide, assuming that if kidney stones could be seen on the CTI, the stones also would be visible on a conventional Kidney-Ureter-Bladder-abdominal-radiography (KUB). **Aim:** To evaluate whether the CTI can predict radiopacity. **Materials and Methods:** Three radiologists evaluated CT-scans, CTI and KUB in 76 kidney stone patients. **Results:** 54 of 76 patients (71%) had radiopaque stones on KUB. 43(57%) of these also could be seen on CTI, PPV: 100% and NPV: 67%. In the KUB positive and CTI negative kidney stones (11 patients) mean kidney stone diameter was 4 mm and mean HU 742 compared to mean 4 mm and 656 HU in the KUB negative stones ($p=0.001$). Patient's "anterior - posterior depth" (APD) at the kidney stone level in the KUB positive group was mean 26 cm compared to 24 cm in the KUB negative group ($p=0.009$). **Conclusion:** If the kidney stone can be seen on CTI it is also visible on KUB (PPV 100 %). CTI do however underestimate the radiopacity of stones on KUB (NPV 67 %). Kidney stones $HU>742$, stone location in the kidney and proximal ureter and $APD<26$ cm independently predict agreement between CTI and KUB with regard to radiopacity.

SS11: Christos Bristogiannis, C Scavone, G Stallone, R Vinci, L Macarini; Foggia, IT. Magnetic resonance imaging in patients with autosomal dominant polycystic kidney disease (ADPKD) type I. Volumetric assessment of kidney cysts after 24 months of treatment with rapamycin

Purpose: The aim of our study was to evaluate by MRI the effectiveness of rapamycin to reduce the volume of kidney cysts in patients with ADPKD, type I. **Methods and materials:** In a period of 24 months we examined 44 patients affected by ADPKD in treatment with rapamycin. Patients underwent MRI before and after treatment. MRI was performed using a 1.5-T system and a four-channel phased-array coil. The imaging protocol of our study provides: Localizer sequence, Axial DUAL Fast Field Echo (FFE) T1-weighted sequences, Axial Single - Shot (SSh) T2-weighted sequences, Coronal BALANCE Fast Field Echo (FFE) T2-weighted sequences. Cyst volumes were measured in Coronal T2-Weighted images by the use of a semi-automated contour tracing software. The volumes were calculated by multiplying all outlined areas by the section thickness and summing the volume of each section. **Results:** After one year of treatment with rapamycin, the volume of kidney cysts was reduced in 26 patients (59.1%), in 7 patients (15.9%) remained almost unchanged, while in the remaining 11 patients (25%) increased. **Conclusion:** Rapamycin seems to be efficient in reducing the volumetric progression of cysts in patients with ADPKD.

SS12: Mike Notohamiprodjo, M Pedersen, KP Lodemann, B Jespersen, A Helck, C Glaser, MF Reiser, M Fischereder, SP Sourbron; Munich, GE. Comparison of Gd-DTPA and Gd-BOPTA for studying renal perfusion and filtration

Purpose: Protein binding of MR contrast agents may cause a systematic error in perfusion- and filtration parameters measured with MR-Renography. The purpose of this study was to measure the magnitude of this error using a dual-agent protocol. **Material and Methods:** Eight healthy Danish Landrace pigs were examined with DCE-MRI. In 4 pigs a bolus of Gd-DTPA (no protein binding) was injected, followed by Gd-BOPTA (10% protein binding). The order was reversed in the other 4 pigs. A two-compartment filtration model was generalized to allow for protein binding, and fitted to whole-cortex ROI curves. Single-kidney plasma flow and -volume, tubular flow (or GFR) and tubular transit time of both agents were compared. **Results:** Data show a strong systematic underestimation ($p<0.001$) in GFR by Gd-BOPTA ($33\pm7.2\%$), and no significant differences ($p>0.05$) in plasma flow ($2.2\pm18\%$), plasma volume ($-1.7\pm7.8\%$) and tubular transit time ($3.1\pm7.2\%$). The order of injection had no significant effect. **Conclusion:** Theory and experiments agree that perfusion parameters of both agents are comparable, whereas GFR is underestimated with Gd-BOPTA due to the dependence of relaxivity on protein content. Hence GFR cannot be measured with protein-bound contrast agents, but the proposed dual-agent protocol may produce new functional indices measuring protein filtration.



Dok vas neki
pokušavaju preveslati,
mi s vama
plovimo
kroz život.*

* na ovom mjestu neki se sitnim slovima ograđuju od svojih obećanja. Mi nećemo!
U Croatia osiguranju možete biti sigurni da ćete naknadu štete dobiti na vrijeme
i u ugovorenom iznosu. Zato što mi nismo kao drugi. Mi smo Croatia osiguranje
i na vašoj smo strani već 127 godina.

SS Kidney II

Moderator: Vibeke Logager, Copenhagen, DK

SS13: Micheal Breen, Kevin Murphy, Sinead Kinsella, Patrick McLaughlin, Sebastian McWilliams, Fiona O'Neill, Joseph Eustace, Michael Maher; Cork, IR. **Quantification of abdominal aortic calcification in renal transplant recipients in the ABC-HART study**

Aortic calcification predicts all-cause mortality in renal transplantation. Several different methods for assessing aortic calcification exist but to date the agreement of these methods has not been examined. **METHOD** In this prospective study 65 renal transplant patients underwent 64 slice CT (LightSpeed XTE, GE) of the lumbar spine. Calcification was scored using 3 methods; a volumetric analysis using threshold based segmentation, the semi-quantitative Aortic Calcification Index (ACI) which involves visual assessment of 12 radial sectors at 10 axial levels and thirdly by applying the standardized Framingham method to the lateral scan projection radiograph (SPR) performed at CT and to lateral radiographs of the lumbar spine (n=57) taken at the start of the cohort. **RESULTS** 42 patients (64.6%) had aortic calcification using the volumetric based method. Volume of calcification correlated with arterial pulse wave velocity ($r=0.38$, $p=0.02$), pulse wave pressure ($r=0.53$, $p<0.001$) and history of cardiovascular events (Mann Whitney U test, $p=0.02$). Compared with the volumetric method, the ACI showed closest agreement ($r=0.96$, $p<0.001$); lateral SPR ($r=0.84$, $p<0.001$) and lateral lumbar radiograph ($r=0.85$, $p<0.001$) agreement was slightly lower. **CONCLUSION** The semi-quantitative ACI provides equivalent results to the volumetric quantification of abdominal aortic calcification using CT. The scoring of lateral lumbar radiographs shows good rank agreement with these methods but slightly poorer sensitivity and specificity.

SS14: Jane Belfield, S Powell; Liverpool, UK. **Renal Transplant Living Donor Assessment – The Experience So Far**

Introduction CT was introduced last year for assessing potential living donors in a large renal transplant centre. Aim To assess how many CTs were performed in the past 12 months, and how many renal arteries and veins were identified in each patient. **Method** All patients who had CT for living donor assessment from 8/05/2010 to 8/05/2011 were included. Data was collected retrospectively on patient demographics, number of renal arteries and veins, incidental findings, and whether the patient underwent donor nephrectomy. **Results** 63 CT scans were performed - 30 male, 33 female. Age range 20 – 70 years, mean 47 years. 41/63 (65%) had single left renal artery, 42/63 (67%) single right renal artery. 33/63 (52%) had single arteries bilaterally. 6/63 (9.5%) had more than one renal artery supplying each kidney. 53/63 (84%) single renal vein bilaterally, 10/53 (16%) two or more renal veins, 5/63 (8%) retroaortic left renal vein. Incidental findings in 34/63 (54%), commonest renal calculus 7/63 (11%). 1/63 large lymph nodes, suspicious for lymphoma. 19/63 (30%) underwent donor nephrectomy, 21/63 (33%) are waiting a date for surgery. 39/40 (97.5%) left nephrectomy undertaken or planned. **Conclusion** CT is useful in demonstrating renal vascular anatomy and incidental findings.

SS15: Joseph Evans, Jane Belfield; Liverpool, UK. **Ultrasound Assessment of the Transplanted Kidney - the Experience at a University Teaching Hospital in the UK**

Ultrasound is a vital tool in the assessment of the transplanted kidney. It is used both in the immediate postoperative period and for long-term follow-up to aid early detection of important complications such as acute tubular necrosis, renal artery stenosis, renal vein thrombosis and hydronephrosis. Our hospital trust is a tertiary centre for renal transplantation, performing approximately 77 renal transplants per year. Ultrasound is performed by consultant radiologists, ultrasonographers and radiology registrars. We have retrospectively analysed 4 months of ultrasounds performed between 01/11/2010 and 28/02/2011. In the 4 months studied, 203 scans were performed on 101 patients. 32 (35%) of the patients were in the immediate postoperative period, accounting for 103 (51%) of the scans performed. Post-operative patients had a median number of 3 (range 1-6) scans in the first 30 days. 55 (27%) scans were performed by Consultants, 25 (12%) by Registrars and 123 (61%) by Sonographers. The complications detected included four patients with renal artery stenosis, two with renal vein thrombosis and one with arteriovenous fistula. We present detailed analysis of our experience of transplant ultrasound and provide imaging examples of normal appearances and the most common complications encountered.

SS16: Kevin Murphy, S Kinsella, M Breen, S O'Neill, S McWilliams, J Coyle, F O'Neill, N Moore, A McGarrigle, JA Eustace, MM Maher; Cork, IR. **CT Bone Mineral Density Assessment And Bone Health In ABC-HART Study Renal Transplant Recipients**

Purpose: Accurate assessment of bone mineral density (BMD) is of key importance in renal transplant recipients. We assess the hypothesis that lumbar spine BMD assessment with dual energy x-ray absorptiometry (DXA) is imprecise in this population and that quantitative CT (QCT) is superior. **Methods and Materials:** A cohort of 64 successful renal allograft recipients participated. DXA assessment of the lumbar spine (L2-L4), hips and non-dominant forearm was undertaken. QCT of the lumbar spine (L1-L3) was also undertaken. **Results:** The T scores for the trabecular QCT were on average lower than the lumbar spine DXA by -0.88 (95% CI -1.33 to -0.43). Trabecular QCT lumbar spine T scores and DXA T scores from the radius agreed closely (mean difference 0.06) (95% CI -0.40 – 0.53) and femoral sites (-0.34, 95% CI -0.72 – 0.05). Trabecular QCT T score values more accurately identified those that had a collapse or fragility fracture (n=15) than the gold standard lowest DXA T score from all sites ($p=0.01$ & $p=0.28$). **Conclusion:** QCT is a valuable tool in the post renal transplant population in accurately assessing BMD and predicting fracture risk. The appraisal of lumbar spine BMD by QCT is superior to DXA.

SS17: Jon K Bell, N Porter, J Suntharanathan, J Cain, YY Lim, AJ Bradley; Manchester, UK. **Multidetector CT urography single phase contrast enhanced technique for the examination of renal tract stones: a comparison of results with and without furosemide**

Aim: Current techniques in CT urography favour two scans (pre-contrast and single post-contrast). The aim of this study was to establish whether the identification of upper tract stones would be possible using only the post-contrast scan, enabling dose reduction. The effect of furosemide before the post-contrast scan was also assessed. **Methods:** We conducted a retrospective review of examinations performed using pre-contrast and post-contrast scans with a split-bolus technique. The first group of patients were imaged without furosemide and the second group with furosemide. A urologist reported the post-contrast scan and their findings were compared independently with the pre-contrast scan. **Results:** Forty-three patients were included in both groups. Without furosemide, the sensitivity and specificity of stone detection on the post-contrast scan was 50% and 91% respectively. This increased to 100% and 94.1% with furosemide. The mean density of the collecting system was significantly lower with furosemide (219 v 933HU; $p < 0.0001$), and there was greater distension. Mean stone density was 886HU (231-2229HU). **Conclusion:** Furosemide improves dilatation of the collecting system and increases the difference in density between contrast and stones. A single phase post-contrast scan with furosemide has high sensitivity for detecting stones and removes the necessity of a pre-contrast scan.

SS18: Dave Douwes, V. Cappendijk, F. Bakers, D. Loeffen, R. Beets – Tan; Maastricht, NL. **Influence of preparation protocol on urinary tract filling in CTU**

Purpose CT Urography (CTU) has become the most frequently requested examination in the evaluation of the urinary. However, preparation protocols may vary significantly amongst different institutions from oral fluid intake to the use of diuretics. Our purpose was to evaluate the influence of preparation protocols on urinary tract filling. **Methods and Materials** 80 patients were prospectively randomized into four groups. Group A received no preparation, group B drank 1000cc of water, group C was injected 140cc of saline and group D received 10mg Furosemide iv. Pre-heated (37°C) contrast material (110ml Iopromide, Ultravist, Bayer) was injected using split bolus technique. The urinary tract was divided into six segments: left (L1) and right (R1) pyelum, proximal (L2, R2) and distal (L3, R3) ureter. Three radiologists, blinded for the preparation protocol and each other, scored the filling of each segment on a three point scale. (1=no filling; 2=partial; 3=total) All data were compared in group analysis using Kruskal-Wallis, ANOVA, Tukey. Results Highest means (range 2.68–2.98+0.7–0.2) per segment were registered for group D (L1, L2, L3, R1 and R3) followed by R2 for group B. Significant differences in mean scores were seen for ureter filling ($p < 0.002$), not for pyelum ($p > 0.05$). **Conclusion** Administration of 10mg Furosemide iv just prior to CTU results in optimal filling of the ureters compared to other preparation protocols.

SS19: Andrei Lebovici, Lucian Valerian Lucan, Tiberiu Guttman, Cosmin Caraiani; Cluj-Napoca, RO. **Triple bolus multidetector computer tomography: clinical experience**

Objective : To evaluate the opacification and the quality of examination using a triple bolus protocol. **Method:** Retrospective analysis of 86 patients who underwent MDCT urography in our clinic, from the beginning of 2011. The protocol that was a triple bolus technique consisting in injecting 40 ml of contrast agent with 1.5ml/sec at 0 sec, 45 ml at 2ml/sec at 60 sec and 60 ml at 3ml/sec after 25 sec. No oral hydration or Furosemid administration were used. The opacification of the urinary tract and the quality of the vascular and parenchyma contrast enhancement were assessed. **Results:** Out of the 86 patients with an average age of 49,1 (10 - 82) , total opacification of the upper urinary tract was obtained in 88.4% , distal ureter 69,7% and the bladder in only 9,3% of the patients. The veins and parenchyma showed optimal enhancement in 95,4% of the patients while arterial enhancement was optimal in 81,6% . **Conclusion:** Triple bolus protocol is an excellent technique for the evaluation of the upper urinary tract, vessels and parenchyma.

SS20: Ivan Žokalj, M. V. Logager, B. Kolarić; Čakovec, HR. **Differentiation of solid forms of renal cell carcinoma on computed tomography postcontrast scans – influence of tumor attenuation measurement methods**

OBJECTIVE. The objectives of this retrospective research are: 1.to determine if solid forms of clear cell renal cell carcinoma (RCC) can be differentiated from other solid forms of RCC on the basis of attenuation values on computed tomographic (CT) images, 2.to evaluate which method of tumor attenuation measurement gives better results in differentiation of solid forms of RCC. **MATERIALS AND METHODS.** CT scans of patients with solid forms of RCC will be reevaluated and kidney tumor attenuation will be measured with use of ROI of 5mm² and ROI with diameter which is equal to tumor maximal diameter excluding cystic parts and calcifications. Results of tumor enhancement measurement will be divided into four groups according to the method of measurement, results of tumor solid parts attenuation measurement (with large and small ROI) and results with use of tumor enhancement ratios (with large and small ROI). Results of tumor attenuation measurements will be correlated with pathologic findings. Regarding statistical analysis, Fisher exact test or chi-square test for categorical variables, T-test or Mann-Whitney test for numerical and ordinal variables will be performed. Measure of reliability of diagnostic methods will be assessed by Kappa test. The results will be supplied later.

SS21: Deuk Jae Sung, Woo Young Kang, Beom Jin Park, Min Ju Kim, Sung Bum Cho, Yu Whan Oh, Kyoo Byung Chung; Seoul, KR. **Perihilar branching patterns of renal artery and extrarenal length of arterial branches and tumor feeding arteries on multidetector CT angiography: Relevance to segmental renal artery clamping during laparoscopic partial nephrectomy**

To assess the extrarenal length of arterial branches and tumor feeding arteries on MDCT angiography for predicting the feasibility of segmental artery clamping during laparoscopic partial nephrectomy (LPN). MDCT angiograms of 64 patients

with renal tumors less than 4cm were retrospectively reviewed by two radiologists. The perihilar branching patterns were assessed on both sides. 3D volume-rendered images were used to measure the extrarenal length of segmental plus presegmental arteries and tumor feeding arteries. One presegmental plus segmental arteries (72.7%) was the most common perihilar branching pattern. The extrarenal length of inferior segmental plus presegmental arteries (mean, 33.05 mm) and posterior segmental plus presegmental arteries (32.30 mm) were longer than any of the other segmental plus presegmental arteries (apical, 23.87 mm; superior, 26.80 mm; middle, 29.23 mm) ($p < 0.03$). The extrarenal length of lower pole tumor feeding arteries (35.94 mm) was longer than those of upper and mid pole tumor feeding arteries (24.95 mm; 29.62 mm) with difference between lower and upper pole tumor feeding arteries ($p < 0.02$). Volume-rendered MDCT angiography reveals the perihilar branching patterns and length of renal arteries. Tumors in lower pole, supplied by inferior or posterior segmental artery, will likely be more amenable to segmental artery clamping during LPN.

SS22: Azza Hamid, Ismaeel M Maged; Suez, EG. Role of High Resolution Contrast-Enhanced Magnetic Resonance Angiography

Introduction: Transplant renal artery (RA) stenosis (TRAS) is the most frequent posttransplantation vascular complication. Contrast enhanced magnetic resonance (CeMRA) angiography has been established as the preferred imaging technique for the evaluation of TRAs because it does not require the use of iodinated contrast material and does not expose the patient to ionizing radiation. Digital subtraction angiography (DSA) is the gold standard in the evaluation of arterial tree of the renal allograft. Aim: This study was carried out to assess the accuracy of ceMRA in the detection of arterial complications after renal transplantation. Patients and Methods: Thirty renal transplant patients with suspected arterial complications in which both ceMRA and DSA were performed were included in the study. The HR ceMRA shows 93.7 % sensitivity, 80 % specificity, 88.2% positive predictive value, 88.9 % negative predictive value and 88.5 % accuracy. Conclusion: HR CeMRA is an accurate reliable tool in the assessment of arterial complications after renal transplantation. It may replace DSA as a diagnostic modality with reservation of interventional techniques for endovascular treatment of suitable cases.

SS23: Akira Yamamoto, Jeff L. Zhang, Henry Rusinek, Hersh Chandarana, Pierre Hugues Vivier, James Babb, Thomas Diflo, Devon John, Judith Benstein, Laura Barisoni, David Stoffel, Vivian S. Lee; Okayama, JP. Low-dose MR renography analyzed using a multi-compartmental tracer kinetic renal model may help to differentiate noninvasively between acute rejection and ATN after kidney transplantation

Purpose: To assess the ability of quantitative low-dose 3D MR renography to identify the cause of acute graft dysfunction. Materials and Methods: Sixty patients with transplanted kidneys were included, 31 normal function, 29 acute dysfunction due to acute rejection ($n=12$), ATN ($n=8$), chronic rejection ($n=6$) or drug toxicity ($n=3$). MR renography was performed at 1.5-T with 3D GRE imaging. Using a multi-compartment renal model, glomerular filtration rate (GFR), tracer mean transit time (MTT) for vascular compartment (MTTA), tubular compartment (MTTT) and collecting system compartment (MTTC) were calculated. We also derived MTT for whole kidney ($MTTK=MTTA+MTTT+MTTC$) and fractional MTT of each compartment ($MTTA/K=MTTA/MTTK$, $MTTT/K=MTTT/MTTK$, $MTTC/K=MTTC/MTTK$). These parameters were compared in patients in the different study groups. Results: There were significant differences in GFR and MTTK between the acute dysfunction group and the normal function group. MTTA/K was significantly higher in the acute rejection group than in the normal function group or in the ATN group and MTTT/K was significantly higher in the ATN group than in the normal function group or in the acute rejection group. Conclusion Low-dose MR renography analyzed using a multi-compartmental tracer kinetic renal model may help to differentiate noninvasively between acute rejection and ATN after kidney transplantation.

SS24: Maja Hrabak Paar, Ranka Štern Padovan, Marko Kralik, Mario Lušić; Zagreb, HR. CT and MRI of adrenals in patients with arterial hypertension

Objective: CT and MRI are both frequently used for detection and characterization of adrenal pathology in patients with hypertension, but there are scarce data which technique is better for adrenal tumor imaging. We compared ability of these two modalities to detect and characterize adrenal masses. Materials and Methods: CT and MRI examination was performed in 15 patients (8 females) with 18 adrenal masses (11 adrenocortical adenomas, 5 myelolipomas, 1 pheochromocytoma, 1 uncharacterized) or adrenal hyperplasia (1 bilateral, 4 unilateral). In all patients the presence, number, size, and morphology of the masses were analyzed and compared between the two modalities. Results: Small adrenal masses (< 1 cm) were more confidently recognized using CT than MRI. Two masses (one adenoma and one pheochromocytoma) were detected using both CT and MRI, but MRI only enabled their characterization. One adrenal myelolipoma could not be detected using MRI without comparison with CT due to lack of borders towards retroperitoneal adipose tissue. Conclusion: Because of better spatial resolution and detection of calcification, CT should be preferred method for detection of small adrenal tumors. MRI should be used for follow-up, especially in younger patients, and if CT fails to characterize the tumor.

SS Genital Radiology

Moderator: Gabriele Masselli, Rome, IT

SS25: Ayako Tamura, H.Tanaka, C.Ishii, M.Nakano, S.Okamoto, M.Sakamoto; Tokyo, JP. Evaluation of diffusion restricted lesion in ovarian dermoid cysts

Purpose: To evaluate high signal intensity (SI) on diffusion-weighted imaging (DWI) of ovarian dermoid cysts. Patients and methods : Sixty six women with dermoid cyst proven histopathologically underwent DWI with multiple b-values

($b=0,1000,2000,5000\text{s/mm}^2$) using a 1.5T magnet. Three radiologists retrospectively reviewed the MRI, compared DWI with opposed-phase images (OP) and with fat-suppressed T1WI (CHESS), focusing on high SI on DWI. Results: All dermoid cysts had high SI on DWI even with a high b-value. High SI on DWI corresponded to an area with small amount of fat which decreased SI on OP. On CHESS imaging, signal loss representing fat was noted in 20 cases, whereas no diminished SI in 26 cases. A case was diagnosed as dermoid cyst by fat component detected only on DWI and OP. Conclusion: Despite of benign tumor, dermoid cyst can have restricted diffusion area such as malignant tumors. High SI on DWI corresponded to a slight amount of fat which were sometimes missed when evaluated only by CHESS. We should keep in mind when we see high SI in ovarian tumors on DWI, we should look back on chemical shift imaging to confirm the existence of fat and to make a correct diagnosis.

SS26: Jongchul Kim, Daejeon, KR. Imaging Findings of Ovarian Malignant Mixed Mesodermal Tumors

Purpose: To describe imaging findings of rare ovarian malignant mixed mesodermal tumor (MMMT) with malignant epithelial and mesenchymal elements. **Materials and Methods:** The ultrasonography (US), computed tomography (CT), and magnetic resonance (MR) image findings of pathologically proven six ovarian MMMTs in five patients were retrospectively analyzed in terms of bilaterality, size, cystic or solid, contrast enhancement, ascites, peritoneal seeding, adjacent organ invasion, distant metastasis, etc. **Results:** Bilateral ovarian MMMTs was present in one patient. The largest diameter range from 3.2 to 13.3 cm (mean, 4.9 cm). All tumors were heterogeneous on imaging. Necrotic or hemorrhagic portions were found in three patients. Three of the six MMMTs were multilocular cystic, and three were mixed solid and cystic. All the solid components show dense homogeneous contrast enhancement. Ascites were found in all patients. Uterine surface involvement was present in one patient, peritoneal seeding in two, hepatic surface encroaching in one, and later distant metastasis in two. **Conclusion:** Ovarian MMMTs usually present as large, aggressive, heterogeneous, mixed solid and cystic tumors of high surgical stage, with frequent peritoneal seeding and adjacent organ invasion, especially in postmenopausal women.

SS27: Agnieszka Biane-Bodzak, M. Studniarek, D Wydra, J Kobierski, A Szymanska-Dubowik, M. Liro; Lodz, PL. Diffusion Coefficient (ADC) and Diffusion-Weighted Imaging Apparent in the Diagnostic of Recurrent or Residual Ovarian Cancer

Purpose: To evaluate the usefulness of DWI for the detection of residual or recurrent ovarian cancer and to measure apparent diffusion coefficient (ADC) values of peritoneal deposits, solid metastatic tumors, metastatic lymph nodes and liver metastases. **Material and Methods:** 30 patients who were treated for ovarian cancer by the cytoreduction surgery and chemotherapy underwent abdominal and pelvic MRI. MRI studies using a 1.5T equipment included T1- and T2-weighted SE and breath-hold SPGR and DWI with a b value of 10, 100, 200, 500 and 1000 s/mm². All patients were scheduled for laparotomy and histopathological confirmation. ADC values were measured by ROI on reconstructed maps. ADC values separately calculated for all foci were compared using Student t test. **Results:** Tumour recurrence was established by the operation in 28 patients. MRI examinations alone were false-negative in 8 patients with peritoneal dissemination. DWI correctly depicted 23 patients with cancer, but the missed foci were measured 2 mm. 108 lesions were outlined in MRI for ADC calculation. There was statistically significant difference among the ADC values of peritoneal foci, metastatic lymph nodes and liver metastases ($p=0.03$). **Conclusion:** From our study experience DWI may be considered as a useful technique in depicting recurrence of ovarian cancer.

SS28: Eun Ju Lee, Jae Joo Hee, Ryu Sug Hee; Suwon, KR. The intracystic villous pattern as a sonographic feature of ovarian metastases from colon cancers

Objective: To describe the sonographic features of ovarian metastases from colon cancers with emphasis on the intracystic villous pattern. **Method:** 23 histologically proven cases of ovarian metastases from colon cancer were included. Their sonographic findings were reviewed retrospectively for bilaterality, tumor size, patterns with locularity, papilliations and solid areas, margin, echogenicity and cystic content, blood flow, ascites, and peritoneal seeding, focusing on the presence of intracystic villous projections. **Results:** Of the 34 total tumors (bilateral in 11 cases), Mean tumor size was 9.1 cm (range, 2–22 cm). 26 tumors were multilocular-solid, 5 tumors were unilocular-solid, and the remaining 3 tumors were solid. Intracystic villous projections were present in 29 (93%) of 31 tumors with multilocular- and unilocular-solid pattern. Color Doppler sonography depicted moderate to marked vascularity with a mean resistive index of 0.34. Ascites and peritoneal seeding were present in 12 cases. **Conclusion:** The intracystic villous pattern in a multilocular-solid tumor is a distinct sonographic feature of ovarian metastases from colon cancers and could be helpful in differentiating these tumors from primary or other metastatic ovarian tumors

SS29: Hae Jeong Jeon, UC Park.*, YJ Kim, HS Park, SI Jung, SW Park, Seoul, KR. Surgical usefulness of endoanal ultrasound in patients with fecal incontinence after obstetric injuries

The purpose of study is to give the endoanal sonographic images and the concordance between sonographic and surgical findings of fecal incontinence in patients with obstetric injuries. 153 patients with fecal incontinence visited our clinic, and 27 obstetric injuries were identified by using anal ultrasound. A rotating probe with a 360 degrees radius and a frequency between 7.5 and 10 MHz was introduced. 27 patients were categorized as Type I (injury to the internal anal sphincter), Type II (extending into the external anal sphincter, mixed injuries to the both muscles), Type III (extending into the other perineal muscles) injuries. Control data were obtained from volunteers ($n=23$). The most frequent site of obstetric injury was the external anal sphincter (92.6%, $n=25$). Compared to the 27 operative findings, the agreement rate for the identification of sphincteric injuries was in 86% of type I, in 95% of type II, and in 60% of type III. In the anal manometry

study, maximal voluntary contraction was inversely proportional to CGS ($r=-0.664$, $p=0.02$). With the routine use of endoanal ultrasound, defect or scar can be delineated in the different type of obstetric injuries. Sonographic findings are useful for planning the incontinence operation.

SS30: Gwang-Woo Jeong, Tae-Hoon Kim, Gwang-Ju, KR. Metabolic changes associated with genital erection induced by erotic video stimulation in pre- and post-menopausal women : A preliminary study using a functional MR spectroscopy

This study was initiated to evaluate the brain metabolic changes associated with genital erection induced by erotic video stimulation in premenopausal and postmenopausal women using a functional MR spectroscopy (fMRS). Eleven premenopausal (mean age: 36.4 ± 8.3) and 11 postmenopausal (mean age: 55.8 ± 2.7) women were participated. The genital arousal was assessed using a five-point Likert scale. The scores for the perceived genital arousal were respectively 3.00 ± 0.89 in premenopausal and 3.18 ± 0.87 in postmenopausal groups ($p > 0.05$). In the neutral condition, the postmenopausal women showed significantly lower levels of NAA compared with the premenopausal group ($p < 0.05$). In the activation condition, the postmenopausal women showed lower levels of NAA and α -Glx ($p < 0.05$). An increase of α -Glx level in premenopausal women may be associated with neuronal activation induced by genital arousal with visual sexual stimulation. The lower levels of NAA in both neutral and activated conditions in postmenopausal women may be due to variation with age. In conclusion, the fMRS showed the metabolic difference between premenopausal and postmenopausal women during the genital arousal evoked by visual stimulation. This finding would be useful to evaluate the neural mechanism associated with genital arousal in conjunction with biochemical changes following menopause.

SS31: Marko Kralik, Ranka Štern Padovan, Maja Hrabak Paar, Vice Šunjara; Zagreb, HR. Reliability of MDCT and MRI in analysis of urogenital anomalies

The aim of this study was to determine the clinical value of MDCT and MRI examinations in patients with urogenital anomalies. We analyzed the MDCT and MRI examinations of the abdomen and pelvis in 29 patients (25 women, age 11-32 years) with urogenital anomalies, excluding patients with isolated anomalies of the urinary tract. Anomalies were: gonadal dysgenesis, gonadal descent disorders, uterovaginal anomalies, anomalies of the mesonephros, anal atresia, and testicular feminization. With MDCT examination, only anomalies of the urinary tract could be reliably proved, while genital tract anomalies could only be suspected. With MRI it was possible to analyze details of developmental disorders, shape, number, position, and anatomic relations of the affected organs, particularly in the region of pelvis. Data from subsequently performed surgical procedure, available for 14 patients, were identical to MRI findings in 11. MRI was not reliable in determining the exact level of disorder of the vertical fusion in obstructive uterovaginal anomalies and in identifying lateral fusion disorder of the vagina. When compared to MDCT, MRI proved significantly more reliable in the detection and characterization of urogenital anomalies, and detailed analysis of changes in the anatomy, which is of particular importance for planning of surgical treatment.

SS32: Henrik Leonhardt, B. Gull, K. Kishimoto, M. Kataoka, L. Nilsson, P. O. Janson, E. Stener-Victorin, and M. Hellström; Gothenburg, SE. Uterine morphology and peristalsis assessed by magnetic resonance imaging in women with polycystic ovary syndrome

BACKGROUND: In anovulatory women with polycystic ovary syndrome (PCOS) an increased endometrial thickness has been observed, correlated to endometrial hyperplasia. Uterine peristalsis, probably of importance for female fertility, has not previously been studied in PCOS. The objective of this study was to assess whether women with PCOS have altered uterine morphology and peristalsis. **METHODS:** In this prospective case-control study 55 women with PCOS and 28 controls were examined using magnetic resonance-imaging (MRI), assessing thickness of the endometrium, junctional zone (JZ) and myometrium, and in a cine-display mode evaluating peristalsis. **RESULTS:** The endometrium was thinner in women with PCOS compared to controls, while the thickness of the JZ and myometrium was similar. Peristalsis was less commonly observed in PCOS (adjusted $P = 0.014$), but when detected, peristaltic frequency (waves/min) was higher in PCOS (adjusted $P = 0.010$). High free E2 and low insulin sensitivity were the variables best indicating occurrence of peristalsis in women with PCOS. **CONCLUSIONS:** A thinner rather than thicker endometrium was found in women with PCOS. Uterine peristalsis was less common in women with PCOS, but when observed, the frequency was higher. Whether the possibly disturbed uterine peristalsis in PCOS contributes to infertility remains to be investigated.

SS33: Junko Takahama, Megumi Takewa, Nagaaki Marugami, Aki Takahashi, Saeka Hori, Satoru Kitano, Kimihiko Kichikawa; Kashihara City, Nara, JP. 1H Magnetic Resonance Spectroscopy of malignant uterine endometrial lesions at 3T MRI system

PURPOSE The purpose of this study is to clarify the usefulness of the 1H MRS for in vivo uterine endometrial lesions at 3T. **METHOD AND MATERIALS** The subjects were 10 patients with uterine endometrial malignancy. All cases had thickened endometrium over 15mm. The uterine endometrial lesion was histopathologically proved as follow: endometrioid adenocarcinoma:7 (G1:4, G2:2, G3:1), clear cell carcinoma:2, carcinosarcoma:1. MR system was MAGNETOM Verio 3T, and the MRS sequence is PRESS method (TR=2000, TE=30, average128, FA=90). For the analysis, fitting curve was applied for choline, lactate, and 2.0 ppm peak. The existence of these peak was correlated the histopathological diagnosis. **RESULTS** In all 10 cases, MRS was successfully observed. Choline peak was detected in all 10 cases. Lactate and 2.0 ppm peak was detected in 9 cases. The one case, clear cell carcinoma, showed only choline peak. The ratio of the peak between 2.0 ppm and lactate showed remarkable large amount in 2 cases that were endometrial adenocarcinoma G3 and clear cell carcinoma. In these cases, the mitosis and necrotic change was histopathologically observed dominantly. **CONCLUSION** In the uterine endometrial malignant lesions, MRS showed choline and lactate peak. The lactate peak may be the indicator of histopathological aggressiveness.

SS34: Kyoung-Ah Kim, Sang-Wook Yoon; Gyungggi-do, KR. Pre-Operative Single Dose of GnRH Agonist in Magnetic Resonance Guided Focused Ultrasound Surgery of Uterine Fibroids for Improvement of Efficacy while Avoiding Postmenopausal Discomfort

Purpose The purpose of this study is to assess the initial safety and efficacy of a single dose of GnRH prior to MRgFUS, avoiding postmenopausal discomfort. **Materials and Methods** Twenty premenopausal patients received a single dose of GnRH 30 days before treated using MRgFUS. 22 fibroids were treated with fibroid volume prior the GnRH injection of $204.3\text{cc} \pm 106.4\text{cc}$. The fibroid vascularity was measured before the injection and in treatment day by standardizing its mean pixel intensity to a 0-100 scale. The non-perfused volume (NPV) was normalized per total energy delivered as a measure of technical efficacy. **Results** No adverse events were reported during follow-up. None of the patients expressed postmenopausal discomfort. Mean fibroid shrinkage was $13\% \pm 12\%$. The mean fibroid vascularity reduction was $37\% \pm 77\%$ and in 45% of the fibroids the intensity reduction allowed efficient treatment as in hypo-intense fibroids according to their normalized NPV. The reduction in intensity was highest for iso-intense fibroids. The post treatment NPV ratio was $63\% \pm 20\%$. **Conclusion** Single dose of GnRH prior to MRgFUS has the potential to improve treatment efficacy mainly by reducing fibroids vascularity, while avoiding the side effects of multiple doses of GnRH.

SS35: Kemal Ödev, A. Küçükapan, D. A. Kreşi, Müslim Yurtçu, Mehmet Kılınç; Konya, TR. Hydatid disease of the genitourinary tract: Imaging findings

Objective: Review of the various imaging findings of hydatid disease of the genitourinary tract. **Material and methods:** From 2000 to 2010, 30 patients (13 males and 17 females) with hydatid disease of the genitourinary tract were managed with dept.of Pediatric Surgery and dept.of Urology. Age ranged from 8 to 79 years. Four patients was examined with IVU. All patients had US and CT examination and MRI in twenty patients. **Results:** IVU showed calcified soft tissue shadow in the renal region in four patients. Different types of renal hydatid cysts were observed by ultrasonography (type I:11, type II:3, type III:5, type IV:1, type V:8). CT showed unilocular thick-walled cyst(n:11) and multilocular cysts (n:7), unilocular cyst with thick curvilinear calcification(n:10) and a high density cyst with calcified hydatid membranes (n:2). Moreover, in two patients pelvic MRI and CT revealed multilocular cystic masses(type III) in the right adnexial region and the urinary bladder wall. The pelvic hydatid disease was confirmed by pathologic examination. **Conclusion:** US can reveal different findings depending on the age evaluation and complications of renal hydatid disease. CT provides better topographic display of the abdomen than US. The evaluation of anatomical relationships, and daughter cysts, which is the hall mark of the hydatid disease can be reliable demonstrated by MRI.

SS36: Aikaterini Andrianaki, Eirini Pediaditi, Petros Drettas, Maria Raissaki; Heraklion, GR. Ultrasonographic manifestations of subacute or chronic penile trauma seen on the outpatient clinic

Purpose: To illustrate the grey-scale and color Doppler manifestations of subacute and chronic penile trauma. **Material and methods:** 11 males aged 18-61 years underwent 16 cavernosonograms with 5-12 MHz linear array in a HDI 5000 Ultrasound Machine. A recorded traumatic event 1-360 days previously (mean 40) was present in all patients; in 5 during sexual activity, in 3 during motorcycle accidents, in 1 during sports while in 1 following iatrogenic procedures. Symptoms included pain n=2, erectile dysfunction/curvature (n=10) and palpable lesion (n=4). **Results :** Ultrasonographic findings included cavernosal hematomas in 1 test, cavernosal fracture in 2, tunica albuginea's tear with hematoma in 1, penile abscess in 1, peyronie's disease in 10 tests, fibrosis in 2 while increased penile curve without focal lesion occurred in 1 test, urethral dilatation in 1. Doppler was considered useful and contributed to the diagnosis by increasing diagnostic confidence in 3 cases. **Conclusion :** Males with penile trauma may present late following the traumatic event. Ultrasound is a simple, efficient and non- invasive method for the diagnosis of penile trauma and its complications.

SS Renal interventions and Prostate

Moderator: Tarek El Diasty, Mansoura, EG.

SS37: DJ Breen, Sanjin Idriz, A Abbas, NJ Railton, N Mc Gill, AB Nasruddin, D Sanderman; Southampton, UK. Image-guided Ablation of Conn's Adenoma in the Management of Primary Hyperaldosteronism

We present our initial experience of percutaneous thermal ablation of Conn's adenoma in the management of primary hyperaldosteronism. **Methods:** A retrospective study was performed of patients referred for image-guided percutaneous thermal ablation of Conn's adenomas between May2008 and February 2010. Patients underwent assessment prior to ablation including blood pressure, serum aldosterone/renin ratio, serum potassium and contrast-enhanced CT. All ablations were performed under CT guidance. Patients were followed-up at 4-weeks post-ablation with contrast CT and clinical/biochemical assessment at 3-months. **Results:** 5 adrenal adenomas were treated in 5 patients. Mean size of adenomas was 18mm (range 14-25). 4 lesions were treated with cryoablation and 1 with radiofrequency ablation. Patients were discharged within 24-hours of ablation. All 5 adenomas demonstrated complete tumour ablation on CT. At 3-month follow-up 60% (3/5) demonstrated successful treatment as defined by blood pressure $\leq 140/90\text{mmHg}$, normalised serum aldosterone/renin ratio and potassium. 80% demonstrated partial success as defined by systolic blood pressure reduction $\geq 20\text{mmHg}$ and/or diastolic blood pressure reduction $\geq 10\text{mmHg}$ independent of post-ablation biochemical results. **Conclusions:** Our early experience suggests that image-guided thermal ablation of Conn's adenomas shows potential as an effective therapeutic modality in the management of primary hyperaldosteronism, with results comparable with laparoscopic resection.

SS38: DJ Breen, Ausami Abbas, S Idriz, NJ Railton, P Kumar, S George, N McGill; Southampton, UK. Percutaneous Cryoablation Of Renal Tumours: Does Anterior Or Posterior Tumour Site Influence Outcome?

We present our experience of percutaneous cryoablation in the treatment of 118 renal tumours and evaluate whether tumour site (anterior/posterior) influences outcome and risk of complication. Methods: A Retrospective study was performed of renal tumours treated with percutaneous cryoablation at our institution between May 2007 and February 2011. Tumours were defined as anterior/posterior with respect to the longitudinal greater curve of the kidney on CT. Cryoablations were performed percutaneously under general anaesthesia with combined CT/ultrasound guidance. Patients were followed-up with contrast-enhanced CT (10-days, 3-months, 6-months, 12-months, annually). Treatment success was defined by absence of tumour enhancement/disease recurrence at CT. Complications were defined as per Clavien-Dindo criteria ($\geq$ grade 2 defined clinically significant). Results: 118 tumours were treated in 100 patients. Mean lesion size was 31mm (range 11-67mm). Mean follow-up was 12-months (range 3-46months). 55/118 tumours were anterior (47%) and 63/118 posterior (53%). 49/55 anterior (89%) and 58/63 posterior tumours (92%) were successfully treated following single-session cryoablation with no significant difference in success rates ($P=0.753$). Complications occurred in 3/55 anterior (5.5%) and 3/63 posterior tumours (4.7%) with no significant difference ($p=1.000$). Conclusions: Our experience suggests that anterior/posterior tumour location has no significant bearing on treatment outcomes following percutaneous cryoablation of renal tumours.

SS39: DJ Breen, Ausami Abbas, S Idriz, NJ Railton, P Kumar, S George, N McGill; Southampton, UK. Image-Guided Percutaneous Cryoablation of Renal Tumours: Does Tumour Size ≥ 4 cm Effect Outcome?

We present our experience of percutaneous cryoablation in the treatment of 118 renal tumours and evaluate whether tumour size influences the outcome of treatment and risk of complication. Methods: Retrospective review of renal tumours treated with percutaneous cryoablation at our institution between May 2007 and February 2011 was performed. Tumours were defined as <4 cm or ≥ 4 cm by longest transverse diameter on CT. Cryoablations were performed percutaneously under general anaesthesia with combined CT/ultrasound guidance. Patients were followed-up with contrast-enhanced CT (10-days, 3-months, 6-months, 12-months, annually). Treatment success was defined by absence of tumour enhancement/disease recurrence at CT. Complications were defined as per Clavien-Dindo criteria ($\geq$ grade 2 defined clinically significant). Results: 118 tumours were treated in 100 patients. Mean lesion size was 3.1cm (range 1.1-6.7cm). Mean follow-up was 12-months (range 3-46months). 91/118 tumours were <4 cm (77%) and 27/118 were ≥ 4 cm (23%). 85/91 tumours <4 cm (93%) and 22/27 tumours ≥ 4 cm (81%) were successfully treated following single-session cryoablation with no significant difference in success rates ($P=0.123$). Complications occurred in 3/91 patients with tumours <4 cm (3.3%) and 3/27 with tumour ≥ 4 cm (11.1%) with no significant difference ($p=0.132$). Conclusions: Our experience suggests that there is no significant difference in outcome following cryoablation of small renal tumours of <4 cm and ≥ 4 cm.

SS40: Sue Yin Liong, Jonathan Tuck, Alison Bradley; Manchester, UK. Non-elective percutaneous nephrostomy (PCN) service in a tertiary urology centre: can radiologists and urologists agree on timing?

Aim: To compare (1) a non-elective 24-hour PCN service provided at a tertiary urology centre against recommended standards and (2) radiological evaluation of the degree of urgency for PCN with urological assessment. Methods: Prospective audit from 1.1.2009 to 31.12.2010. Uroradiologists compiled data on all PCNs. Patient profile, timing of insertion, and complications were documented. Patients were stratified by radiologists and urologists into three groups - PCN to be performed within 6 hours of referral (Group 1), between 6-24 hours (Group 2) and 24-72 hours (Group 3). Results: 118 of 188 (62.8%) PCNs performed were non-elective. Mean patient age = 65.5 years (SD 17.88). 85.6% procedures were performed between 09.00-17.00, Monday-Friday. 14.4% performed out-of-hours, but none after 23.00 hrs. 44.9% were performed within 6 hours of referral, 38.1% between 6-24 hours and 17% between 24-91 hours. No immediate complications were observed. Long-term complications included sepsis (3%, with one death occurring 9 days post-PCN), bleeding (4%, with one requiring transfusion), tube dislodgement (5%) and blockage (2%). There was agreement between radiologists and urologists on urgency in all but 9 cases ($K=0.865$, $p < 0.001$). Conclusion: The complication rates in our series are within proposed targets of 4-8%. There was good agreement between radiologists and urologists on case urgency.

SS41: Harpreet Lyall, Harry Bardgett; Leeds, UK. Long Term Metallic Stents for Ureteric Obstruction: A Prospective Study of Bradford Teaching Hospitals NHS Experience

Introduction: Long-term metallic ureteric stents have an expected patency of 12 months and may obviate the need for 4 monthly plastic ureteric stent changes. The long term outcome in a prospective contiguous patient group undergoing antegrade metallic stenting for incurable malignancy related hydronephrosis was examined. Methods: Patients selected for stenting were suffering malignancy related hydronephrosis and had an overall long term prognosis greater than 12 months. Pre-procedure and follow up biochemical, clinical and radiological data was recorded. Results: 18 stents were placed in 12 patients. Biochemical results were present for all patients and 10/12 (83.0%) patients had additional radiology and clinical follow up. 1/12 (8.3%) patient had early complication of distal ureteric dissection treated conservatively. There was 1 primary technical failure. There were no readmissions for infection or worsening hydronephrosis. Hydronephrosis resolved in 7/10 Patients (70.0%), only one patient (8.3%) underwent a further procedure for persistent hydronephrosis. 4/10 (40.0%) patients died before 12 months. Overall a 4 monthly stent change was prevented in 8/10 patients (80.0%). Conclusion: Our study demonstrates a low complication and repeat intervention rate. Morbidity of stent replacement was prevented in 80% demonstrating the long term effectiveness of metallic ureteric stents for intermediate prognosis cancer related hydronephrosis.

SS42: Sei Chung Sak, Philippa Claydon, Ferekh Salim; Sheffield, UK. **A review of ultrasound guided renal mass biopsy performed in a tertiary referral centre**

AIMS: To determine the indications, accuracy and complications of ultrasound guided percutaneous renal mass biopsy and its impact on clinical management. **METHODS:** We retrospectively reviewed all (n=31) ultrasound guided renal biopsies performed in our institution from 2002 to 2011. **RESULTS:** The mean patient age was 63.9 years (range 35 to 83 years). The clinical indications for biopsy included 22 indeterminate renal masses and 9 radiologically diagnosed renal cell carcinoma (RCC) which needed histological confirmation for treatment. There were no complications attributed to biopsy. The histological samples were diagnostic in 27 (87%) and non diagnostic in 4 (13%). All 4 non-diagnostic biopsies were due to insufficient (2) or necrotic tissue (2). Of 27 diagnostic samples, 25 were positive for renal malignancy, 1 positive for angiomyolipoma and 1 for tuberculosis. All diagnostic samples had a positive contribution to clinical management by histological confirmation of RCC for oncological treatment (9), alteration of surgical decision to non-operative treatment (8), pre-operative histology confirmation (8) and alteration surgical options such as nephroureterectomy (2). **CONCLUSIONS:** In this series renal biopsy provided useful histological information in almost 90% of cases, with no recorded procedure related complications. Ultrasound guided biopsy is a useful tool for characterising indeterminate renal masses.

SS43: Friedrich Aigner, Andrei Lebovici, Georg Schäfer, Eberhard Steiner, Werner Jaschke, Wolfgang Horninger, Thomas RW Herrmann, Udo Nagele, Ethan J Halpern, Ferdinand Frauscher; Innsbruck, AT. **Enhanced transrectal ultrasound targeted biopsy in men with elevated prostate specific antigen serum levels: Impact on prostate cancer detection**

OBJECTIVE. To evaluate enhanced transrectal ultrasound (E-TRUS) techniques including real-time sonoelastography (RTE) and contrast enhanced transrectal ultrasound (CE-TRUS) for prostate cancer (PCa) detection in men with elevated prostate specific antigen (PSA) serum levels. **METHODS.** A total of 133 men with elevated PSA serum levels (≥ 1.25 ng/mL) showed PCa suspicious lesions on E-TRUS. RTE was done to assess tissue elasticity and hard areas of the peripheral zone were considered suspicious for malignancy. CE-TRUS was done with cadence contrast pulse sequencing (CPS) technique to assess tumor neoangiogenesis and areas with increased and rapid contrast enhancement in the peripheral zone were considered suspicious for malignancy. All patients underwent an E-TRUS targeted biopsy of the prostate in the suspected lesions. PCa detection rates for E-TRUS were analysed. **RESULTS.** PCa detection rate of E-TRUS targeted biopsy was 59.4% (79/133) using a median of 5 cores per patient and a median of 3 cores per lesion. RTE showed a per patient detection rate of 56.5% (70/124) and CE-TRUS of 74.2% (69/93). **CONCLUSIONS.** Targeted biopsy based upon E-TRUS confirms a diagnosis of PCa in approximately 60% of men with RTE and/or CE-TRUS findings.

SS44: Mohamed Abou El-Ghar, Ayman El-Baz, Fahmi Khalifa, Ahmed Elnakib, Ahmad Firjani, Tarek El-Diasty; Mansoura, EG. **Non-Invasive Image-based Approach for Early Diagnosis of Prostate Cancer**

Purpose: To detect feasibility of image based computer analysis of dynamic contrast enhanced MRI (DCEMRI) as a non-invasive technique in diagnosis of prostate cancer. **Material& Methods:** The study data consists of 270 3D Data sets collected from 21 patients suspected of having prostate cancer using DCEMRI images. We propose a non-invasive approach for early diagnosis of prostate cancer from DCE-MRI. First, the prostate region is extracted using a new stochastic approach. Second, an elastic alignment approach that is based on the solution of the Laplace equation between equispaced separated contours of the segmented prostate region is applied for the correction of local deformations. Third step, the wash-in-wash-out-curves that show the propagation of the contrast agent into the tissue are obtained. Finally, the tumor boundaries are determined using a deformable model approach and color maps that illustrate the propagation of the contrast agent in the prostate tissues. **Results:** Patients with prostate cancer show an abrupt increase to the higher perfusion values. Subjects with benign pathology show a delay in reaching their peak perfusion. **Conclusion:** The peak perfusion value, the wash-in slope are the major two extracted features for classification. These promising results indicate sound potentialities for clinical application of our framework.

SS45: Radhakrishnan Jayan, Chinedum Anosike, Jane Belfield; Liverpool, UK. **How Does T1W Sagittal Spine MRI Compare with Bone Scintigraphy in Assessing for Skeletal Metastases in Prostate Carcinoma?**

Background : Although Isotope bone scan is traditionally the modality of choice, MRI is a sensitive and specific modality to assess for skeletal metastases from prostate carcinoma. Whole body imaging is time-consuming to perform and report. Previous studies indicate that isolated peripheral metastases sparing the axial skeleton are very rare. **Aim :** To evaluate the use of the single T1W Sagittal Thoracolumbar Spine MRI sequence (T1W Sag MRI) and correlate with Tc-99mMDP bone scan. **Results :** 80 patients had both tests in one year from May 2010 and were included in the study. 6/80 (7.5%) patients had skeletal metastases by imaging and clinical follow up. No patients had evidence of peripheral skeletal metastases without axial skeleton involvement. Metastatic disease could be confidently diagnosed using Bone Scan by itself in 3 patients and MRI alone in 2 patients. Correlative evaluation using the two modalities together improved confidence leading to a diagnosis in all 6 cases. **Conclusion :** The single T1W Sagittal MRI sequence shows potential to be a useful tool in assessing patients with prostate carcinoma for metastatic disease. However Isotope bone scan still has a useful role and is complementary in making a more definitive diagnosis especially when appearances are equivocal.

SS46: Nicola Marotti, F.S. Carbone, T. Carfagno, G. Belmonte, V. Ricci, L. Volterrani; Siena, IT. **Simplified biexponential quantitative analysis of Diffusion-Weighted Magnetic Resonance Imaging (DW-MRI) of prostate tissue: a preliminary evaluation**

The aim of our study is evaluate whether apparent diffusion coefficient (ADC), pure diffusion coefficient (D) and perfusion fraction (p(f)) can support prostate tissue characterization. We examined 11 patients with histologically proved prostate

cancer by trans-rectal ultrasound biopsy. Eight patients have hormone therapy, three were not on therapy. All our patients performed DW-MRI of prostate with endorectal coil using a 1.5 Tesla MR scanner, employing different b-value: 0 s/mm², 600 s/mm² and 1000 s/mm². We assessed ADC using b=600 s/mm² (ADC600) and b=1000 s/mm² (ADC1000), D and p(f) in peripheral prostate, tumor, central gland and obturator internus muscle (as reference point). We applied a multivariate statistical analysis to our data set. There is a statistically significant difference in the ADC600, ADC1000 and p(f) between all prostate regions, whereas D doesn't present a statistical relevance between tumor and central gland. The D does not allow a differential diagnosis between prostate carcinoma and adenomyoma. ADC600, ADC1000 and p(f) may help the prostate tissue characterization and distinguish between normal gland, adenomyomatosis and tumor. Mostly the p(f) is an interesting parameter to characterize prostate tissue independently of therapy-induced signal inhomogeneities and so bypass some conventional MRI pitfalls.

SS47: Claudia F. Quintian Schwieters, MJ Martinez Barcina, T Marti Ballesté, J Alberola Bou, C Errando Smet, F Rodríguez Escobar, P de la Torre Holgera; Barcelona, ES. **Male urinary incontinence after radical prostatectomy: what must the radiologist know about the artificial urinary sphincter (AUS) AMS 800?**

Nowadays, the treatment of choice for urinary incontinence secondary to radical prostatectomy is the placement of an AUS AMS 800. This is a mechanical device made up from several components which significantly improves the quality of life in most of these incontinent patients. Radiologists must be familiarized with these devices, their components and correct anatomical placement, and the way they work. At our institution, we have placed 245 AUS, and 16 of them had to be removed due to clinical complications. The most frequent complications found were: infections, urethral atrophy, decubitus ulcer and sphincter mechanical problems. Our purposes are: 1-To familiarize the radiologist with the normal radiological appearance of AMS 800 AUS. 2-To give some tools to help radiologist to perform radiological examinations with a correct technique (i.e. retrograde urethrography). 3-To provide images and radiological signs of malfunction and complications after the placement of the device. 4- To highlight the information that must be included in the radiological report.

SS48: Satoru Takahashi, Kazuhiro Kitajima, Yoshiko Ueno, Kazuro Sugimura; Kobe, JP. **Volumetric 3D-T2-weighted MRI for the prostate cancer at 3T with interactive multiplanar reformat imaging: Are there any additional values over 2D-T2-weighted images?**

To evaluate if interactive MPR using 3D-T2WI at 3T could improved diagnostic accuracy of preoperative evaluation for PCa in comparison with conventional 2D-T2WI. 60 biopsy-proven PCa patients underwent preoperative 3T MR study including axial and coronal 2D-T2WI with 0.46mm³-voxel, as well as 3D-T2WI with 0.09 to 0.28mm³-voxel. DWI and DCE studies were also obtained with 3-mm-slice thickness. Multiplanar 2D-T2WI or interactive MPR with 3D-T2WI were separately evaluated with and without viewing DWI or DCE. Then, a likelihood of extracapsular extension (ECE) and seminal vesicle invasion (SV) were assigned with a five-point scale for these six sets of imaging. ROC analysis and diagnostic accuracy values were determined using histopathological findings of radical prostatectomy as a reference standard. 20 of 60 patients showed ECE on pathology, while 3 of 60 had SV. Regarding ECE evaluation, there were no statistically significant differences between 2D- and 3D-T2WI in Az-value, sensitivity, specificity and accuracy (p=0.41-0.67). Either 2D- or 3D-T2WI with DCE could detect all SV, while T2WI with and without DWI failed to detect SV. In conclusion although interactive MPR using 3D-T2WI had similar diagnostic accuracy to multiplanar 2D-T2WI, 3D-T2WI could provide little diagnostic advantages even at 3T.

SS49: Tsutomu Tamada, Akira Yamamoto, Yoshimasa Jo, Hiroki Higashi, Katsuyoshi Ito; Kurashiki city, Okayama, JP. **Prostate cancer detection in patients with total serum prostate-specific antigen levels of 4-10 ng/ml: diagnostic efficacy of diffusion-weighted imaging, dynamic contrast-enhanced MRI and T2-weighted imaging**

OBJECTIVE. To evaluate the utility of T2-weighted imaging, DCE-MRI and DWI for detecting prostate cancer with PSA levels of 4-10 ng/ml (gray-zone). **MATERIALS AND METHODS.** Fifty patients with gray-zone PSA levels underwent MR imaging before biopsy. According to the sites of biopsy, the prostate was divided into eight regions on MR images. These regions were individually evaluated for the following features: detectability of prostate cancer on per-region and per-patient bases; and relationship between tumor size and positive or negative MR findings for tumor detection. **RESULTS.** On a per-region basis, sensitivity and specificity of tumor detection were 36% and 97% for T2-weighted imaging, 43% and 95% for DCE-MRI, 38% and 96% for DWI, and 53% and 93% for the combined MRI, respectively. Sensitivity of combined MRI to detect tumor was significantly higher than those for the individual methods. Tumor size was significantly larger in regions of positive MR findings than in regions of negative MR findings. On a per-patient basis, sensitivity and specificity of combined MRI to detect prostate cancer were 83% and 80%, respectively. **CONCLUSIONS.** Combined T2-weighted imaging, DWI, and DCE-MRI findings appear potentially useful for detecting and managing prostate cancer, even when performed for patients with gray-zone PSA levels.

WS13 Emergency

moderator: Robert Berkenblit, Bronx, NY, US

a) Diagnostic approach to lower urinary tract emergencies – **Nancy S. Curry, Charleston, SC, US**

Learning Objectives: To discuss the classification, diagnosis and management of trauma to the bladder and urethra. Types of injury, mechanisms, imaging approach and treatment will be presented and illustrated.

b) Trauma to adrenals and upper urinary tract - **Phil Kenney, Little Rock, AR, US**

Learning objectives: 1) prescribe best imaging techniques for detection of upper urinary tract injuries; 2) describe

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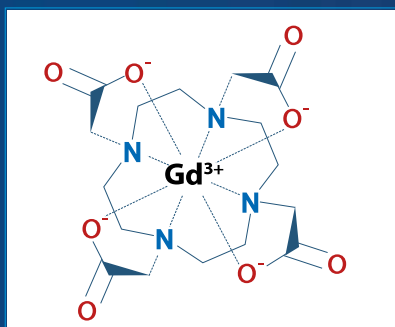


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features that allow correct classification of renal injuries; 3) compare and contrast features of adrenal hematoma from incidental adrenal masses

c) Management of iatrogenic injury with interventional radiology methods - **Liana Cambj-Sapunar, Split, HR**

Learning objectives: 1) To present imaging features of typical iatrogenic injuries to the urinary tract; 2) To present basic techniques of the IR treatment; 3) To discuss various materials for the management of iatrogenic injury with interventional radiology methods

WS14 Imaging of scrotum

moderator: Damir Miletić, Rijeka, HR

a) Acute scrotum - **Olivera Nikolić, N.Sad, RS**

Learning objectives: To describe the US features of acute pathologic conditions of the scrotum; to describe color and spectral Doppler features of acute pathologic conditions of the scrotum; to learn the differential diagnosis of acute scrotal conditions

b) Ultrasound of testicular masses - **Jongchul Kim, Korea**

Learning objectives: Describe the anatomy and embryology of the scrotum that are pertinent to the understanding of testicular masses. List the classification of testicular masses with their incidence and tumor markers respectively. Discuss the some characteristic ultrasonographic findings of testicular masses with their differential diagnosis.

c) Imaging of paratesticular lesions - **Mustafa Secil, Izmir, TR**

Learning Objectives: To understand the anatomy and pathological processes of the paratesticular area; To review the imaging methods for the evaluation of paratesticular lesions; To discuss the radiological findings of disease processes involving the paratesticular region.

WS 15 Stone imaging and renal interventions

moderator: Nicholas Papanicolaou, Philadelphia, PA, US

a) Renal stones: what the radiologist needs to know - **Wael Shabana, Ottawa, CN**

Learning objectives: 1. to review the different techniques that are used in stone imaging as well emphasis new updates; 2. to identify the factors that affect stone clearance and recognize the management strategies that are required for treating renal stone and define the role of imaging in this process.

b) Percutaneous nephrolithotomy: what can go wrong - **Anders Magnusson, Uppsala, SE**

Learning objectives: not provided

c) Stones: small and large: how to treat.- **Julian Keanie, Edinburgh, UK**

Learning objectives: 1. As a general principle, stones should be managed by the least invasive, lowest risk method that is appropriate for the stone size, location, opacity and the patient circumstances. The majority of stones encountered are small (5 mm or less), and the majority of these can be managed conservatively. 2. Of the remaining stones, the majority can be treated by external shock wave lithotripsy (ESWL). However, ESWL cannot be used to treat radiolucent ureteric calculi, unless at the vesicoureteric junction. The plain KUB remains of crucial value in the management of stones. 3. Stones resistant to ESWL, radiolucent stones and stones 2 cm or larger require surgical intervention. The first two groups can usually be managed with ureteroscopy (semirigid or flexible). Stones 2 cm or larger, or that have failed alternative managements, require percutaneous nephrolithotomy (PCNL). In selected cases, planning CT urography is invaluable, and on rare occasions CT-guided puncture is necessary.

WS16 Renal vascular disease

moderator: Sanja Stojanović, Novi Sad, RS

a) Doppler ultrasound - **Gordana Ivanac, Zagreb, HR**

Learning objectives: To learn technical issues related to Doppler US procedure; To learn criteria for diagnosing hemodynamically significant renal artery stenosis; To learn value of ultrasound for planning of endovascular treatment and follow-up of patients

b) CTA and MRA - **Fulvio Stacul, Trieste, IT**

Learning objectives: To learn technical issues related to CTA and MRA procedures; To become familiar with the clinical applications of CTA and MRA; To understand advantages and limitations of CTA and MRA

c) PTA and stenting in renal vascular disease - **Boris Brkljačić, Zagreb, HR**

Learning objectives: To learn technical issues related to PTA and stenting in renal vascular disease; To understand the role of imaging in selection of patients for the procedure; To compare data about endovascular treatment and medical therapy of renovascular hypertension

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Posters I - Scrotum and penis

I-1 Athina C. Tsili, M. I. Argyropoulou, D. Giannakis, S. Tsampalas, N. Sofkitis, K. Tsampoulas; Ioannina, Greece. Title of presentation: **Diffusion-weighted MR imaging of normal and abnormal scrotum: preliminary results**

Objectives: To evaluate the feasibility and diagnostic performance of DW MR imaging in the characterization of scrotal lesions. **Methods and Materials:** Twenty-six men with 31 scrotal lesions were retrospectively evaluated. All MR examinations were performed on a 1.5 T unit, using a pelvic phased array coil. Diffusion-weighted sequences were obtained using a single shot, multi-slice spin-echo planar diffusion pulse sequence and a b factor of 900 s/mm². The DW MR characteristics and the apparent diffusion coefficient (ADC) values of normal scrotal contents and scrotal diseases were evaluated. Comparison between the ADC values of normal scrotum, benign lesions and scrotal malignancies was performed. The accuracy of conventional sequences and DW imaging combined with conventional images in characterizing scrotal lesions was calculated. **Results:** The ADC values of testicular malignancies differed significantly from those of normal testis and benign intratesticular lesions, and the ADC values of benign extratesticular lesions from those of normal epididymis ($p < 0.05$). The overall accuracy of conventional imaging, DW imaging alone and DW MR combined with conventional sequences in the characterization of intratesticular lesions was 91%, 87% and 100%, respectively. **Conclusions:** DW MR imaging and ADC values may provide valuable information in the characterization of scrotal diseases.

I-2 Athina C. Tsili, M. I. Argyropoulou, D. Giannakis, E. Zioga, S. Koukos, N. Sofkitis, K. Tsampoulas; Ioannina, Greece.

Isolated granulomatous orchitis: MR imaging findings

Objectives: Isolated granulomatous orchitis is a rare chronic testicular inflammation. We present a case of a 33-year old man, with a diffuse pattern of granulomatous orchitis, confirmed by means of testicular biopsy. The value of MR imaging in the preoperative diagnosis of this rare benign intratesticular lesion is presented. **Materials and methods:** A 33-year old man was referred to the Urology department for right vague scrotal pain. MR imaging of the scrotum was performed on a 1.5-T magnet unit, using a surface coil. The protocol included fast spin-echo axial, sagittal and coronal T2-weighted sequences and spin-echo axial and sagittal T1-weighted sequences, both before and after the intravenous administration of gadolinium chelate compounds. **Results:** Two right small-sized intratesticular lesions were detected, of low signal intensity on T2-weighted images, not enhancing after gadolinium administration. The absence of contrast enhancement on MR imaging was considered as suggestive of a benign diagnosis. Differential diagnosis included other hypovascular intratesticular mass lesions, as testicular Leydig's cell hyperplasia or adrenal rest tissue. **Conclusions:** Hypovascular intratesticular masses, including isolated granulomatous orchitis are rare, but a diagnosis of benignity based on imaging findings should be strongly suggested, obviating the need for radical orchiectomy.

I-3 Karolina Bolanča, A. Muldini Dragoja, B. Brkljacic; Zagreb, HR. **Adenomatoid tumor of epididymis – ultrasound (US) and magnetic resonance (MRI) imaging**

An adenomatoid tumor is the most common extratesticular neoplasm. This benign tumor can arise from the epididymis or the testicular tunica vaginalis. We present a case report of 76-year-old male patient with mild left scrotal pain 2 months in duration and palpable left scrotal mass. Scrotal US exam revealed hypoechoic sharply margined lesion in left epididymis without vascular flow at colour doppler exam. MRI was performed and showed hypointense 2 cm lesion on T2-weighted images and isointense with testicular parenchyma on T1 weighted images with fat saturation. Dynamic and delayed enhanced images revealed that the thin uniform band of hypointense parenchyma around the tumor showed early and persistent enhancement. The mass itself showed internal enhancement less than that of normal testicular parenchyma. Specific US and magnetic resonance imaging findings with respect to tumor location, morphologic features, can aid in the evaluation of paratesticular neoplasms and help narrow the differential diagnosis. Because extratesticular lesion are often benign urologist can choose more conservative treatment.

I-4 Jae-Joon Chung, Jin Chung, Jeong-Sik Yu, Joo Hee Kim; Seoul, KR. **Penile leiomyosarcoma: Imaging findings of sonography and computed tomography - A case report**

Penile leiomyosarcoma is a very rare disease of which only 49 cases have been reported in the English literature. This disease is clinically and pathologically classified into the superficial and deep types, which shows a lobulated, expansile, soft tissue mass in CT images with peripheral rim enhancement and internal homogeneously low density. Ultrasonography showed a lobulated and heterogeneously hypoechoic solid mass in the distal tip of penis. These imaging findings could be helpful to characterize the penile mass. We report the ultrasonographic and CT findings of a deep type of a penile leiomyosarcoma that helped characterize a penile mass and review the published literature.

I-5 You Me Kim, Sae Ah Lee; Chungnam, KR. **US Imaging of scrotal tumor & pseudotumor: A Pictorial Review**

Abstract: Ultrasonography is the initial imaging modality for evaluating scrotal mass lesion. In this presentation, we will show the anatomy of the scrotum and US image features of intratesticular and extratesticular masses with comprehensive review.

I-6 Norman Loberant; Nahariya, IL. Penile Mondor's Disease

A 41-year-old male was self-referred to the ultrasound unit because of "a swollen vein on his penis" for the past 2-3 days. Gray-scale ultrasound revealed enlarged distal dorsal penile veins, which were non-compressible. Other vascular structures were normal. Diagnosis: Thrombosis of the superficial dorsal penile veins (Penile Mondor's Disease (PMD)) Discussion: Isolated superficial venous thrombosis of the chest wall was initially described by Mondor in 1939. Similar clinical presentation has been described in other regions of the body and is often termed Mondor's Disease. Isolated thrombosis of the superficial dorsal penile veins was first reported in 1958. In two recent series, an association was noted between PMD and (1) prolonged sexual activity, and (2) surgical varicocelelectomy. Other associations have been noted in the literature. Physical examination in PMD shows cord-like induration with variable tenderness in the subcutaneous tissue of the dorsum of the penis. Ultrasound examination shows non-compressible superficial veins on gray-scale examination with no evidence of flow on color or spectral Doppler. The anatomy of the superficial and deep venous system of the penis accounts for the occurrence of PMD. PMD is a self-limited condition, resolving in 4-6 weeks with symptomatic treatment.

I-7 Nagaaki Marugami, Toshiko Hirai, Miho Saito, Junko Takahama, Aki Takahashi, Kimihiko Kichikawa; Kashihara City, Nara, JP. High-frequency ultrasonography of acute scrotum

Purpose 1, To introduce scrotal ultrasonography with high-frequency transducer (11-15MHz) at B mode, color Doppler, and contrast enhanced mode. **2,** To demonstrate the appearance of high-resolution ultrasonography in patients with acute scrotum. **Contents 1,** Method and technique of scrotal US imaging using high-frequency ultrasonography **2,** Etiology of acute scrotum **3,** Imaging of acute scrotum; testicular torsion from complete to intermittent torsion, segmental testicular infarction, testicular appendage, epididymo-orchitis from acute to chronic phase, testicular trauma, testicular tumors and inguinal disorders. **Summary** Grey-scale, color Doppler and contrast-enhanced ultrasonography with high-frequency transducer demonstrate high accuracy in the diagnosis of acute scrotum.

I-8 Marija Šimić, A. Hrkać Pustahija, J. Ćurić, G. Ivanac, B. Brkljačić; Zagreb, HR. MRI of the post-traumatic penis

Injury to the penis may result from penetrating or nonpenetrating trauma. Penile trauma requires specialized management. Differential diagnosis between albugineal tear and other penile injuries must be obtained as soon as possible, since early surgical repair of albugineal tear reduces significantly the rate of posttraumatic fibrotic sequelae. Penile MRI is preferably performed in the first few hours following injury. Tear of the tunica albuginea must be identified since it requires surgical management. MRI can accurately depict the presence, location, and extent of tunical tear, which manifests as discontinuity of the tunica albuginea. The tunica albuginea is well demonstrated as a low-signal-intensity structure on both T1- and T2-weighted images and MRI is optimal for the evaluation of the integrity of this anatomic structure even in patients with severe swelling and pain of the penis. MRI, non-invasive and painless, is the imaging modality of choice in the evaluation of traumatic injuries of the penis. Because of its multiplanar capability, MRI will give a good roadmap to the urologist regarding the extent and location of a tunical tear, as well as associated injuries to the corpus spongiosum and urethra.

I-9. Seong Kuk Yoon, Dong Ho Ha, Myongjin Kang, Byeong-Ho Park, Kyung Jin Nam; Busan, KR. Tumors and tumor-like lesions of the epididymis

The epididymis is an extratesticular structure and can be involved various pathological conditions. These conditions range from inflammatory conditions to benign and malignant tumors. Although the epididymis is a superficial structure, a clinical examination frequently fails to provide a specific diagnosis, as the clinical history and physical findings are similar under many conditions. Many disease processes that affect the epididymis may produce common symptoms and signs, including pain, swelling and a palpable mass at the time of presentation, and differentiation of these diseases is important for determination of appropriate management. The purpose of this review is to describe the normal anatomy of the epididymis and surrounding scrotal structures and radiologic and pathologic features of inflammatory conditions and various tumors, with an emphasis on imaging findings that facilitate diagnosis.

Posters II - Kidneys

II-1. Marijana Antic, Kamran Moshirian Ghodduci, J. De Mey; Brussels, BE. Angiomyolipoma presenting as massive renal haemorrhage following minor trauma

Learning Objectives: Familiarity with Angiomyolipoma may prompt recognition of this disease as a possible cause in a patient presenting with a retroperitoneal haemorrhage. **Background:** A 43 year old man presented to the emergency department with progressive pain in the left hypochondrium following a minor fall hours earlier while gardening. The patient was haemodynamically stable. On palpation a tender mass was felt in the left hypochondrium. Ultrasound revealed a large haematoma initially suspicious for a splenic haemorrhage. CT scan confirmed a very large subcapsular renal haematoma with active bleeding. The patient underwent angiography with arterial embolization and made a full recovery. **Imaging Findings:** CT imaging revealed a large subcapsular renal haematoma of 18cm with contrast extravasation and areas of fat within the lesion. Renal angiography was performed immediately. It revealed a lesion from the central region of the left kidney with abnormal hypertrophic arteries, fistula forming, multiple tiny pseudo aneurysms and regions of contrast extravasation. Transcatheter arterial embolization was performed. **Conclusion:** Angiomyolipoma of the kidney are considered relatively common benign lesions composed of abnormal vasculature, smooth muscle and adipose elements. Rarely these lesions may rupture and bleed resulting in life threatening haemodynamic instability, prompt diagnosis is thus essential.

II-2. Teck Chin, J. Evans, J. Belfield; Liverpool, UK. CT KUB in Acute Renal Colic – the Importance of Non-Calculi Related Findings.

Purpose: To identify and assess the incidence of non-calculi related findings on CTKUB scans performed for acute renal colic. This poster aims to demonstrate some mimics of renal colic seen on CT KUB. **Materials/Methods:** A retrospective analysis of CTKUB scans for acute renal colic was performed between January and March 2011 through the local radiology electronic systems. All scans and reports were analysed to determine if there was a plausible cause for the patient's clinical presentation. **Results:** 102 CTKUB scans were identified for inclusion into this study. 16 (15.7%) had positive calculi related findings compatible with a presentation of renal colic. However, significant non-calculi related findings were identified in 17 (16.7%) scans, of which 11 (10.8%) were mimics of acute renal colic. Examples include epiploic appendicitis, transitional cell carcinoma of the ureter, localised diverticular perforation, haemorrhagic renal cyst, abdominal aneurysm and liver metastasis. A rectosigmoid tumour and pulmonary nodule were also identified. **Conclusion:** The clinical presentation of acute renal colic can manifest in various non calculi related pathology. Indeed the incidence of such pathologies in this study was on par with true calculi-related renal colic findings. It is important to look for findings outside the urinary tract when evaluating CTKUB.

II-3. Blanca Paño Brufau, M. Domingo, L. Buñesch, M.C Sebastià, R. Salvador, C. Nicolau; Barcelona, ES. Usefulness of MDCT enhancement evaluation to differentiate malignant from benign lesions of the upper urinary tract.

Purpose To evaluate the repercussion of adding the enhancement evaluation to differentiate between malignant and benign upper urinary tract (UUT) lesions using MDCT. **Material and methods** From January 2009 to December 2010, we reviewed all patients with the presence of a mass (nodule or repletion defect) or parietal thickening of the UUT in MDCT studies performed due to macroscopic hematuria or bladder TCC staging or follow-up. We selected those patients studied with at least a nephrographic and excretory phase with a final diagnosis obtained by surgery or a MDCT follow-up of at least 9 months. Enhancement of the mass or parietal thickening was defined as a difference >15 HU between two phases. **Results** 40 patients with 42 lesions (28 malignant, 14 benign) were included. MDCT findings were: intraluminal mass (29), parietal thickening (14), mass + parietal thickening (1), enhancing mass (23), enhancing parietal thickening (9). Sensitivity and PPV to diagnose malignancy were: 82.1%/79.3 % for intraluminal mass, 21.4%/42.8% for parietal thickening, 91.3%/91.3% for enhancing mass and 80%/44.4% for enhancing parietal thickening. **Conclusion** Detection of enhancement significantly increased the accuracy of MDCT in differentiating benign and malignant lesions especially when an intraluminal mass was detected.

II-4. Jeong Yeon Cho, Seung Hyup Kim, Sang Youn Kim, Min Hoan Moon; Seoul, KR. Renal Cystic Diseases: from fetus to adult

Renal cystic disease refers to a heterogeneous entity of various causes. The purpose of this exhibition is to review the radiological features of variable renal cystic diseases. The contents of this exhibition includes as followings. Simple and parapelvic cysts, Bosniak classification system, hereditary renal cystic diseases including ADPKD, ARPKD, medullary cystic disease, nonhereditary renal cystic diseases including multicystic dysplastic kidney, acquired cystic disease, and localized cystic disease, and rare hereditary syndromes with renal cystic diseases including tuberous sclerosis, Von Hippel Liandau disease, Meckel-Gruber syndrome, and Jeune syndrome. Although the diagnosis can be made on the basis of history of the patient and imaging findings, it is often difficult to differentiate each cystic disease. Bosniak renal cyst classification system is a communication tool between radiologist and urologist. Being familiar with the characteristic findings may be helpful to diagnose and treat variable renal cystic diseases.

II-5. Yoon Young Jung, Mi Hye Im, Eun-Kyung Kim, Tak Keun Yoo, Yun Sun Choi; Seoul, KR. Tubulocystic Carcinoma of the Kidney with Pelvic Bone Metastasis: a Case Report with Imaging Findings

Tubulocystic carcinoma of the kidney is a rare neoplasm. Herein, we present a case of histologically proven tubulocystic renal carcinoma in a 22-year-old woman with emphasis on the imaging findings of CT and US and pathological features. Unusually, she had single bone metastasis in the left parasymphyseal pubic bone without any other evidence of metastatic disease on 18F-FDG PET/CT at the time of the diagnosis, few months later bone metastases have progressed into multiple cervical vertebrae and skull base.

II-6. Flavio Malpassini, Rocco Papalia, Valeria Buonocore, Tommaso Bionci, Michele Gallucci, Valeria Panebianco; Rome, IT. Nodule kidney: utility of anatomical mapping using 64-MDCT for the robotic surgery planning

PURPOSE To optimize the depiction of spatial localization of the kidney nodule in patient submitted to robotic surgery. **METHODS AND MATERIALS** 52 patients underwent 64-MDCT before and after i.v. c.a. injection. In all cases 3D reconstructions were performed. Two readers in consensus recorded the size, site and relationship with vessels and collector system of the nodule, by using original classification in 12 quadrants according to urologists. **RESULTS** We found a large anatomical variability especially in terms of collector system distribution. The nodule depiction, with precise localization in specific volumes was helpful for robotic surgery approach. In one case we observed urine collection after procedure, due to a small collector duct adjacent to resection margin and visualized on CT images. **CONCLUSION** Anatomical mapping with 64-MDCT using a classification in multiple quadrants can be consider a valid tool for the robotic surgery planning of the kidney nodule; this approach can reduce post-surgical complications.

II-7. Soo Youn Park, Seong Su Hwnag; Gyeonggi-do, KR. Rare Pararenal Tumors and Tumor like Lesions

PURPOSE: To demonstrate rarely occurring abdominal retroperitoneal tumors or tumor - like lesions. **MATERIALS & METHODS:** We collected rare pararenal tumors and tumorous lesions and demonstrated cases with detail literature

reviews. **RESULTS:** Rarely occurring pararenal tumors and tumorous lesions included paragomiasis hemangiopericytoma, angiosarcoma, mucinous cystadenoma, epidermal inclusion cyst, malignant peripheral nerve sheath tumor, and other inflammatory lesions. **CONCLUSIONS:** Despite rarity of above mentioned pararenal tumor or tumorous lesions, comprehensive review of these lesions may be beneficial for radiologists.

II-8. Mariana Roque, I. Leite, M. Abecasis, I. Távora; Lisboa, PT. Lymphoproliferative renal diseases – CT findings

Objectives: 1-To describe and illustrate the most typical CT findings of lymphoproliferative renal diseases based on our department clinical database. 2-To highlight the role of radiology in lymphoproliferative renal diseases. **Background and discussion:** In the last two decades, the prevalence of extra-ganglionic lymphomas has been raising. Renal lymphoma can be primary (< 1%) or secondary, when there is other organ involvement or lymphadenopathy rather than that adjacent to the kidney. Secondary renal lymphoma is rarely diagnosed because renal biopsy is rarely indicated in the presence of systemic disease. Renal non-Hodgkin lymphoma is more frequent than Hodgkin disease and is almost always a B-cell lymphoma. Plasma cell malignancies, most frequently originating in the bone, are extra-medullary in only 5% and rarely arising from the renal interstitium. CT findings of these renal malignancies, although nonspecific may help to suggest the diagnosis and direct management approach. **Conclusion:** Radiologists should recognize of lymphoproliferative renal diseases CT findings in order to suggest the correct diagnosis and help to differentiate from other more common renal malignancies, that have a different therapeutic approach.

II-9. Marija Šimić, M. Vukelić Marković, J. Ćurić, B. Brkljačić; Zagreb, HR. The role of MSCT in the case of intrarenal bleeding due to a stone obstruction - a case report

We present a case of 74-year-old diabetic male patient with intrarenal bleeding caused by pyelourethral stone obstruction. Spontaneous intrarenal bleeding is a very rare but diagnostically challenging condition. The most common causes are tumors, especially angiomyolipomas, vascular abnormalities, different types of coagulopathic conditions and infectious diseases. Methods of examination were plain abdominal X-ray, abdominal ultrasound (US), intravenous urography (IVU) and multi-slice computed tomography (MSCT). MSCT was the only method that showed intrarenal bleeding and pyelourethral stone. In many institutions low – dose MSCT replaced plain X – ray and IVU in cases of flank pain and suspected calculus due to low sensitivity of aforementioned methods and with ability to reveal other, extra urinary causes of flank pain. Perirenal fluid collection can usually be detected by US, but in the cases of bleeding US has low specificity as to its underlying cause. MSCT finding of intrarenal bleeding correlated with clinical findings of hemoglobin drop. Follow-up MSCT showed complete resolution of intrarenal bleeding and spontaneous elimination of pyelourethral stone with complete regression of clinical symptoms. Renal calculus accompanied with microangiopathy should be considered as a cause of spontaneous intrarenal bleeding.

II-10. Jakša Škugor, V. Zorić-Burić, V. Knežević; Šibenik, HR. Spontaneous rupture of kidney and spontaneous rupture of the spleen in a chronic hemodialysis (HD) patient

Hypovolemic shock and spontaneous renal or splenic rupture are unusual fatal complications in the uraemic patients. We report a case of a 52-year-old female who started with continuous ambulatory peritoneal dialysis (CAPD) in 2003, because of chronic renal failure, and was converted on HD in 2009 because of development of peritonitis sclerosans. In 2010 the patient was admitted to hospital due to severe left flank pain and symptoms of acute abdomen and shock. Computerized tomography (CT) demonstrated perirenal and pararenal hematoma of a contracted left kidney. Nephrectomy was performed and patient was recovered. In 2011 the patient was again admitted to hospital due to left upper abdominal and left shoulder pain, nausea, and vomiting. There was no history of recent trauma. An abdominal ultrasonography showed a hyperechogenic mass which was composed of spleen and perisplenic fluid, which was confirmed on CT and MR. Splenic or renal rupture should be considered in any patient on HD with abdominal pain and shock, regardless of a history of trauma. An aggressive multidisciplinary approach to the management of these patients may decrease the mortality rate.

II-11. Satoru Takahashi, Kazuhiro Kitajima, Yoshiko Ueno, Kazuro Sugimura; Kobe, JP. What urologists wish to know beyond differential diagnosis and staging in preoperative evaluation of laparoscopic surgery for urogenital malignancies

Many urogenital neoplasms are now treated under laparoscopy, including robotic surgery. Detailed preoperative evaluations are now vital to overcome the limited field of view and indirect approaches to the surgical field. The purpose of this exhibit is to demonstrate various key issues to ensure safety of laparoscopic procedures. Basis of laparoscopic surgery for the kidney and the prostate will be reviewed to understand potential causes of procedure-related complications. Then, key issues to avoid complications will be demonstrated for kidney and prostate. For kidney, the importance of hidden tributaries of the renal veins or arteries behind the great vessels will be demonstrated, as they could cause unexpected bleeding during the procedures. The relationship between vessels depends on which course to the kidney is taken; namely trans-abdominal or retroperitoneal approach. The relationship between the collecting system and tumor is important in cases of partial nephrectomy or tumor enucleation. For prostate, the shape of the apex, as well as the prostate base in relation to the bladder neck should be evaluated to define appropriate layer to be resected. The course and degree of the venous complex is vital. It is important to remember that positive pressure during laparoscopic procedure could worsen the abdominal herniation.

II-12. Imran Demirci, Yuksel Barut, Yesim Karagoz, Gulden Ozek; Istanbul, TR. Clavicular metastasis from renal cell carcinoma

Renal cell carcinoma is characterized by a lack of early warning signs, which results in a high proportion of cases of locally advanced disease or metastasis at diagnosis. Metastatic renal cell carcinoma of bone is often associated with disabling

pain and mechanical failure of the skeleton due to pathological fracture. Although metastasis to bone represents an advanced stage of the underlying disease, it may be associated with relatively prolonged survival RCC bone metastases are typically lytic and refractory to conventional radiation fractionation schedules. A 75-year-old man presented with left clavicular pain and fatigue that had persisted for several months. Results of MR imaging confirmed the presence of a large destructive lesion in the clavicle that was suggestive of a metastasis. Additional evaluation with contrast material-enhanced CT of the abdomen and pelvis revealed an exophytic right renal mass that was suggestive of RCC. It often results in lung metastasis, bone metastases are uncommon. However, when bone metastasis occurs, it is the second most common site after the lung. RCC may not be diagnosed until after it has metastasized because the primary tumor can grow fairly large without creating symptoms such as flank pain or a mass in the abdomen.

II-13. Suman Hazarika, T.Das; Assam, IN. Combining Radiological information with co-morbid factor in predicting outcome of emphysematous urinary tract infection : a short study

Introduction Emphysematous infections of the abdomen are generally life threatening in nature and require active clinical work up and very often necessitates surgical intervention. Diabetes is a predisposing factor in all the emphysematous infection that occur in urinary tract. **Aims :** Our presentation aims to describe the classic findings of emphysematous infections of urinary tract based on illustrative examples from our archive. This paper will discuss the co-morbid clinical factor and outcome of emphysematous urinary tract infections from our data base. **Materials & methods** We are retrospectively reviewing the co-morbid factors of the emphysematous infections of the urinary tract in a population of 10 cases (N=10). out of which two are emphysematous cystitis, rest are emphysematous pyelonephritis 6 and emphysematous pyelitis 2. There were bilateral disease in 4 cases (50%, of the emphysematous pyelonephritis). **Results ::** We had good prognostic outcome in 70% of the cases. Morbidity of the patient were related to co-morbid factor as well as radiological depiction of extent of the diseases. The important factors like serum creatinine, low platelet count, altered sensorium on admission & radiological severity determines patient outcome.

II-14. Robert Berkenblit, Susan Frank; Bronx, NY, US. Evaluation of the learning curve for using a voice recognition dictating system in radiology

Introduction: Recent technology has allowed for use of voice recognition (VR) systems for dictating reports. With VR, the radiologist dictates a report into a microphone, software recognizes the words and the report is transcribed instantly. Although VR has benefits there is an expected learning curve. Our study investigates the learning curve of radiologists using a VR system. **Materials and Methods:** Two radiologists new to VR charted their dictation times for dictating x-rays and ultrasounds at various periods in their VR experience. Evaluation was performed during the start of implementation, and at 3 months and 7 months after implementation of VR. **Results:** As expected, the time to dictate radiology reports utilizing the VR system improved for both radiologists over the time of the study. **Discussion:** There is a learning curve with VR. While each radiologist was new to the VR system, with time skills needed for VR improved. Many factors led to more efficient dictating by the two radiologists. Those looking at switching to VR should realize that there will be a learning curve. The process may seem difficult in the beginning, with time the benefits of VR will be apparent.

Posters III – Transplanted kidney, interventional, miscellaneous

III-1. Micheal Breen, Kevin Murphy, Sinead Kinsella, Patrick McLaughlin, Sebastian McWilliams, Fiona O'Neill, Joseph Eustace, Michael Maher; Cork, IR. Quantitative CT – a “one-stop-shop” for metabolic imaging in renal transplant patients?

PURPOSE The purpose of this exhibit is to illustrate the potential role of quantitative CT of the lumbar spine as a “one-stop” metabolic imaging modality in the renal transplant population, given its ability for accurate assessment of both trabecular and cortical bone mineral density, quantification of abdominal aortic calcification and body fat analysis. **CONTENT ORGANIZATION** 1. Introduction 2. Current role of DEXA and lateral lumbar radiographs in the post transplant population 3. Technical protocol for performing low-dose targeted quantitative CT in renal transplant patients 4. Calculation of both trabecular and cortical bone mineral density in the lumbar spine using QCT Pro TM software and its clinical relevance 5. Volumetric quantification of abdominal aortic calcification on CT 6. Body fat analysis on CT 7. Estimated effective doses of the above CT protocol **SUMMARY** Quantitative CT offers a more detailed and clinically relevant assessment of bone mineral density than DEXA in the renal transplant population. The concurrent ability for precise assessment of both aortic calcification and body fat composition highlights a potential role for low-dose targeted CT as a “one-stop-shop” metabolic imaging modality in the renal transplant population.

III-2. Kyoung-Sik Cho, Mi-hyun Kim, Hyuck Jae Choi, Jeong Kon Kim; Seoul, KR.

Various imaging findings of complications of kidney transplantation

The purpose of this exhibition is presenting various imaging findings of complications of the kidney transplantation. Various complications are categorized according to the elapsed time from the transplantation, renal or extrarenal problem, need for surgical or conservative management, and native or transplanted kidney problem. Early detection and accurate diagnosis of complications of kidney transplantation enable proper and prompt management, and can improve quality of life and long-term survival of patient.



III-3. **Maja Hrabak Paar**, Ranka Štern Padovan, Marko Kralik, Božidar Oberman, Vice Šunjara; Zagreb, HR. **CT evaluation of patients with acute lower abdominal and pelvic pain in the emergency department**

Objective: To describe CT findings in male and female patients with acute lower abdominal and pelvic pain, and to determine influence of CT results on further management and treatment of the patients. **Materials and Methods:** Abdominal and pelvic CT was performed in 70 adult patients with inconclusive sonography, who presented with acute lower abdominal and pelvic pain in the emergency department. The scanning protocol was tailored according to the patient's clinical condition and results of laboratory workup, and included oral and/or intravenous administration of contrast material. **Results:** In both genders pelvic and lower abdominal pain was caused by intestinal (appendicitis, diverticulitis, Crohn's disease), and urological (ureterolithiasis, pyelonephritis) disorders. In female patients different gynecological pathology was depicted, including pelvic inflammatory disease, ruptured ovarian cyst, ovarian torsion and fibroid degeneration. **Results of CT examination** determined further conservative, interventional or surgical treatment in most of the patients. **Conclusion:** Due to its availability and speed, CT is excellent method for radiological evaluation of patients with acute lower abdominal or pelvic pain and inconclusive sonography in the emergency department. However, because of high radiation dose, its use should be avoided in young patients if the diagnosis can be established using other imaging modalities.

III-4. **Young-Mi Ku**, Su-Lim Lee, Seong-Su Hwang, Soo-Youn Park, Kang-Hoon Lee; Gyeonggi-do, KR. **Pelvic extraperitoneal spaces and planes**

We divide the pelvic extraperitoneum into three compartments (anterior/middle/posterior compartment) in female and two compartments (anterior/posterior compartment) in male, according to its function and clinical requirement. Multi-laminated fascia of the pelvic extraperitoneum contains expandable potential space named planes such as umbilicoprevesical plane, umbilicovesical plane, combined interfascial plane and mesorectal fascia. The knowledge of the pelvic extraperitoneum is helpful to diagnose and understand the spread of the disease in the pelvic extraperitoneum and organ.

III-5. **Young Rae Lee**, Hyun-Pyo Hong, Hae Won Park; Seoul, KR. **Clinical Applications and Outcomes of the Transcatheter Selective Arterial Embolization in Treating Urinary Tract Tumors**

We present the principal clinical applications of selective arterial embolization in patients with renal, ureteral or bladder tumors, and then we present the different embolization techniques and embolic agents. We also described the outcome assessed clinically and imaging work-up using CT enhancement characteristics, examine tumor shrinkage and loss of vascularity. Selective arterial embolization is effective in controlling acute hemorrhage, persistent hematuria, pain and reduced tumor size in various urinary tract tumors. CT is valuable method to assess need for re-embolization, or need for renal surgery.

III-6. **Teresa Martí Ballesté**, C. Quintian Schwieters, MJ Martínez Barcina, V. Catalá, J. Samaniego Duque, P. de la Torre Holguera; Barcelona, ES. **Central venous catheters as vascular access for haemodialysis: a radiological approach.**

Introduction Central venous catheters as vascular access for haemodialysis are increasing in use. In selected cases venous MDCT angiography may be a useful tool to study vascular anatomy prior central venous catheter implantation, and also to evaluate complications related to them. Our purposes are: - To define the utility of MDCT in the evaluation of the venous system in candidates for use or using central venous catheters, and related complications. - To show MDCT angiographic technique to perform a proper cervicothoracic venous system evaluation in these patients and the utility of 3D post processing techniques. To get our purposes we review: - Types of vascular access for haemodialysis with special focus on central venous catheters. - Indications for cervicothoracic venous evaluation with MDCT: when is it necessary? - An optimized MDCT venous angiography protocol and algorithm of 3D reconstructions are given to properly evaluate the cervicothoracic venous system. - A sample of studies from our database is used to show radiological features emphasizing on normal findings and complications.

III-7. **M^aJosé Martínez Barcina, C.** Quintian Schwieters, T. Martí Ballesté, C. Facundo, V. Catalá, P. de la Torre Holguera, A. Breda; Barcelona, ES. **Potential living kidney donors: MDCT findings leading to exclusion.**

Renal transplantation from a living donor is the best choice of treatment for patients with end-stage renal disease. MDCT is routinely used in the pre-operative evaluation of potential living donors, with two objectives: 1. To obtain detailed anatomical information for surgery plan. 2. To rule out possible renal or extrarenal pathologies or anatomical conditions that may lead to donor exclusion. These conditions include: vascular anatomic variants or renal vascular disease, congenital disease, urinary stones, cysts, tumors... The major teaching points of this exhibit are: 1. To review the role of MDCT for the study of potential live kidney donors 2. To detail radiological findings in the study with MDCT that will determine the exclusion of candidates for live kidney donors. 3. To show sample of cases taken from our MDCT studies database of candidates for live kidney donors excluded due to radiological findings.

III-8. **Peter Popovič**, D. Kuhelj, V. Salapura, M. Glušič, M. Savič, S. Ponorac, M. Garbajs, P. Gregorič, B. Rus Gadžijev; Ljubljana, SL. **Interventional radiological management of the vascular complications of the renal transplantation**

Purpose: To review the role of interventional radiology in the management of vascular complications after renal transplantation. **Materials and Methods:** The most common vascular complication is transplant renal artery stenosis and the first-line treatment has become percutaneous transluminal angioplasty with stenting. Renal arterial and vein thrombosis are uncommon. Treatment for late renal vein thrombosis is thrombolysis with or without mechanical

thrombectomy. The incidence of arteriovenous fistulas and pseudoaneurysms is low. Treatment requires superselective embolisation. Results: Percutaneous transluminal angioplasty has been technically successful in 92- 100% of the cases of renal artery stenosis. Restenosis occurs in up to 62% of cases with angioplasty alone and in up to 10% with angioplasty with stenting. Clinical success rate has been reported in 66- 100% and complications occur in up to 10% of the cases and are usually minor. Treatment of transplant renal vein thrombosis with thrombolysis with or without mechanical thrombectomy has been successful in case reports. Conclusions: Endovascular management of vascular complications has an important role in management of transplant patients and has led to further improvement in graft salvage rates.

III-9. Marco A. Amendola, **Jamie Tisnado**, Malcolm K. Sydnor, Charles A. Ehlenberger, Daniel J. Komorowski, Adrienne R. Daniels, Claudia Amendola; Henrico, VA, US. **The role of interventional radiology in venous blood sampling revisited**

PURPOSE: Venous blood sampling (VBS) was the procedure to localize endocrine tumors before noninvasive imaging. VBS decreased significantly, almost "disappearing." With newer 64-MDCT scanners, small endocrine tumors (<5mm) are found. Most young IRs don't learn or know these IR studies. Lack of knowledge limits physicians' awareness to request appropriate diagnostic tests. **METHODS/MATERIALS:** Most young IRs have little experience in VBS. Some IR and other colleagues aren't aware of availability of these "obsolete" studies. VBS must be "resuscitated." Procedures reviewed are: inferior petrosal sinus VBS and sinography, VBS and venography of neck and mediastinal veins, portal vein and tributaries VBS, VBS from hepatic veins, adrenal VBS and venography, adrenal, retroperitoneal (IVC and tributary veins), thoracic (mediastinal veins) and Gonadal VBS, and venography. **RESULTS:** Radiologists, IRs, and clinicians must be aware of all types of VBS and venography in evaluation of selected patients and clinical and laboratory evidence suggesting endocrine tumor, and complete workup, including noninvasive imaging (US, MDCT, MRI) is nondiagnostic. **CONCLUSION:** VBSs are important procedures to diagnose and localize endocrine tumors when all the "conventional" diagnostic studies fail to localize the tumor(s). VBS is rapid, simple, safe, and easy to perform. VBS must be "resuscitated," and learned by the IRs.

III-10. **Jamie Tisnado**, Malcolm K Sydnor, Daniel J Komorowski; Henrico, VA, US. **The role of interventional radiology (IR) in the management of patients with end-stage renal disease (ESRD)**

OBJECTIVES: Each year there are 200 new ESRD patients per 1,000,000 people in USA, estimated 50-60,000 patients at risk, managed with hemodialysis (HD) via arteriovenous fistula (AVF), peritoneal dialysis or central catheter, renal transplant. Organs are critical shortage. Many patients are not candidates. Complications of two main managements are common. Our institution pioneered in renal transplantation, with vast experience in complication management. **METHODS:** IR plays important role with two types of interventions: (A) Management and maintenance of HD access: AVF, central and peritoneal dialysis catheters; (B) Renal transplantation management. Complications: (a) vascular, (b) urologic, (c) iatrogenic. We illustrate IR management with examples of most, if not all, events. Dual role of IR in central and peritoneal catheters insertion, in management associated with central catheters, AVF (both native and with graft). **RESULTS:** All IR procedures are safe, quick, successful, cost effective in the long-term maintenance of ESRD patients. **CONCLUSIONS:** IR plays an important role in ESRD management with: (A) Insertion of central and peritoneal catheters for dialysis, (B) Management of central catheters, (C) Renal transplantation management, (D) AVF Management. IR must be ready and available in all institutions performing renal transplantation, AVF placement, central insertion, peritoneal catheters for dialysis.

III-11. **Jaime Tisnado**; Henrico VA, US. **The role of interventional radiology in the management of complications of renal transplantation. A comprehensive review.**

OBJECTIVES: Renal transplantation, definitive, curative management for patients with ESRD is effective, safe, and widespread, performed in more institutions; therefore, as more transplants are done, more associated problems and complications are found. Our institution is pioneer in renal transplantation in USA and world; we have acquired vast experience on management of complications. **METHODS:** Few comprehensive reviews are available. We review our experience in IR management of most complications, including (a) Vascular: PTA of renal artery stenoses, renal artery stenting, arterial and venous thrombolysis, filter placement in IVC and iliac veins, AVF embolization secondary to kidney biopsy. (b) Non-vascular: Percutaneous nephrostomy, internal and external urinary drainage, pelvic and ureteral stricture dilatation, ureter stenting, lymphocele and other fluid collection drainage, needle aspiration and core biopsies. **RESULTS:** Most, if not all procedures, are successful in managing all minor and major complications listed above. **CONCLUSIONS:** IR is most important "team" member in managing renal transplant complications. IR procedures are simple, quick, safe, effective and cost-effective. Surgery with morbidity must be avoided, if possible. IRs must be available 24/7. Every effort must be made to salvage transplanted kidney as shortage of organs for transplantation is critical in our country.

Posters IV – Lower urinary tract

IV-1. **Lejla Arnautalić**, M. Šahinpašić, R.Agić; Tuzla, BH. **Unusual urethral fistula - case report**

Urethral fistulas correspond to an abnormal communication between the urethral lumen and a neighboring structure. Most fistulas are related to important urethral and/or periurethral tissue lesions, secondary to the association, in variable proportions, of different factors. The frequency of urethral injury following gynecologic surgery is approximately 1%, with a higher percentage of injuries occurring during abdominal hysterectomies and partial vaginectomies. Urethral injuries are far more serious and troublesome, and are often associated with a high morbidity, formation of urethrovaginal fistulas, and potential loss of kidney function, especially when recognized postoperatively. Imaging, dominated by direct

opacification is essential. It allows the diagnosis, depicts the exact anatomic site and its impact on the urinary tract, and thus leads to the best treatment. In this case report, we present a patient whose urethra was injured (ligation with a suture) during operation, with resulting hydronephrosis. Cystostomy was performed, due to the ligation to the urethra. After a few months the patient came with temperature and palpable mass inside the abdominal wall. CT scan was done, which showed fistula between urethra and m. rectus abdominis, with phlegmona of the abdominal wall.

IV-2. David Durany, Ma Carmen Sanchez, Javier Arce, Eva Barluenga, Juan Carlos Quintero; ES. **Giant urinoma of left leg.**

We depict radiologic findings of a giant urinoma of the left leg (30 cm) due to a bladder fistula from a former pelvic trauma showing MR features, ultrasound and cystography. The patient complained of inguinal pain, leg swelling, painful stiffness and weight loss and he had fever with slightly increase of acute phase reactant. Previously, in another hospital, DVT (deep vein thrombosis) was discarded. The first image test was pelvic-leg MR and it showed a giant lobulated collection of 30 cm long, from supragluteal to popliteal region, in the posteromedial left leg with herniation of anterior bladder wall. Following that, ultrasound and FNA of the fluid collection were done, obtaining yellowish liquid similar to urine. Biochemical, cytological and microbiological tests were done and the liquid was non-infected urine. After that, cystography was done and a fistula from the anterior bladder wall was depicted; showing the relationship between the urinoma and the urinary bladder. Initial conservative treatment (with urinary catheter) improved the patient status and delayed surgical fistulectomy was done. The major aim of this abstract is to depict radiological features (MR, US and cystography) of a giant urinoma of the leg.

IV-3. Seong Sook Hong, Hyun Jeong Park, Seok Bum Kwon, Deuk Lin Choi, Hyun Joo Kim, Yun Woo Chang; Seoul, KR. **The Application of 3D Volumetric US in patients with bladder cancer and its mimickers**

Purpose/AIM The purpose of this exhibit is to present the application technique using 3D volumetric US for bladder lesions and demonstration of various bladder pathologic conditions of bladder cancer, other benign and malignant lesions. Content organization we will present application technique of 3D volumetric US for bladder lesions and present of assessment for sonographic findings of bladder lesions including bladder tumor (various stage tumors and perivesical infiltration), mimicking bladder cancer including malignancy (small cell carcinoma, cervical cancer, colon cancer, bladder metastasis from gastric cancer) and benign lesions (bladder stone, focal cystitis, hemorrhagic cystitis, trabeculation, prominent UV junction, extrinsic indentation for pelvic mass). Summary 3D Volumetric reconstructed US in patients with bladder tumor is a safe and useful technique. The assessments using 3D volumetric reconstructed US make it easier to distinguish bladder cancer and its mimickers including other malignancy and benignancy.

IV-4. Kyoung Ah Kim, Sang-Wook Yoon; Gyeonggi-do, KR. **Rare Urinary Bladder Tumors: Radiologic & Pathologic correlation**

We presented radiologic findings of rare bladder tumors and correlated with cystoscopic and pathologic findings
Contents 1. Classification of bladder tumors 2. Rare benign tumors 1) Inverted papilloma 2) Inflammatory pseudotumor 3) Hemangioma 4) Von Brunn's nest 5) Leiomyoma 3. Rare malignant tumors 1) Malignant fibrous histiocytoma 2) Embryonal sarcoma in adult 3) Adenocarcinoma 4) Squamous cell carcinoma 5) Small cell carcinoma 6) Sarcomatoid carcinoma 7) Mixed malignant tumor 4. Summary Hemangiomas of the urinary bladder shows delayed and persistent enhancement on dynamic image. Rhabdomyosarcoma and MFH show more severe and offensive nature Leiomyoma is similar one in other organ

IV-5. Yongsoo Kim, Woo Kyoung Jeong, Min Yeong Kim; Gyeonggi-do, KR. **Uncommon Urinary bladder tumors; Different imaging features for urothelial carcinoma**

Background Most common subtype of urinary bladder tumor is urothelial carcinoma that accounts for about 85% of all bladder tumors. Most bladder tumors have overlapping clinical symptoms whether benign or malignant. It is critical subject to radiologist to know about discrete different imaging findings among various bladder tumors including rarer subtypes or tumor mimicking lesion. **TEACHING POINTS:** 1. Understanding classification of bladder tumors and frequency. 2. Characterization of image feature correlated with cystoscopic and pathological features. **KEY ISSUES:** We describe the characteristic features about rare form of bladder tumors with cystoscopic, pathological and imaging features, following details; 1) squamous, adeno, small cell carcinoma of epithelial origin, 2) leiomyoma of mesenchymal origin, 3) metastasis or lymphoma as secondary involvement, 4) bladder tumor mimicking lesion such as actinomycosis. **Conclusion:** Despite of similar clinical feature of bladder tumor, some diseases have characteristic imaging findings and different growing patterns. According to tumors subtypes, treatment strategy and prognosis is different. Characterization of variable tumors contributes to distinguish each subtype, and affects to decide performing next imaging modality or adequate management. Here, we owe to deal with some unusual subtypes of bladder tumor such as rarer form of epithelial and nonepithelial tumors.

IV-6. Marko Kralik, Ranka Štern Padovan, Maja Hrabak Paar, Vice Šunjara, Mario Lušić; Zagreb, HR. **MDCT and MRI in evaluation of tumors of the male urethra.**

Tumors of the male urethra are rare, arising predominantly in the dorsal urethra, which limits assessment by clinical and endoscopic examination. The aim of this study is to show the role of MDCT and MRI examinations in the assessment of local and distant spread of cancer of male urethra. Two patients with squamous cell carcinoma of the urethra underwent MDCT and MRI of the pelvis. Numerous dilatations of the urethra because of strictures due to long-term recurrent urethritis preceded the diagnosis of cancer in both patients. In the first patient the tumor was discovered by the MDCT, but

without the possibility of more detailed assessment of the local tumor spread. In the second patient, MDCT examination revealed no tumor. MR examination clearly showed local tumor invasion in spongiform and cavernous bodies of the penis, urogenital diaphragm, prostate, skin and subcutaneous tissue of the perineum in both patients. In the analysis of enlarged lymph nodes MDCT and MRI were congruent. In our patients, MRI performed better in local straging of the tumor, while speed and large scannig volumes rendered MDCT better for assessment of remote tumor spread and complications

IV-7. **Kyoung Ja Lim**, Young Lan, Seo; Eun Joo, Yun; Dae Young, Yoon; Chul Soon, Choi; Sang Hoon, Bae; Yun-Jin Jang; Seoul, KR: **Ureteral Tuberculosis with Solitary Enhancing Mass Mimicking Transitional Cell Carcinoma**

Genitourinary tuberculosis (GUTB) is the second most common extrapulmonary presentation of tuberculosis, affecting 8–15% of the patients with pulmonary tuberculosis. From the lungs, the kidneys are affected through hematogenous dissemination, with subsequent involvement of the ureters and bladder through descending infection of the collecting system. We experienced a case of ureteral tuberculosis with solitary enhancing mass mimicking transitional cell carcinoma in left mid ureter with upstream ureter dilatation. The patient underwent nephroureterectomy and confirmed chronic granulomatous inflammation such as tuberculosis.

IV-8. **Ana Muldini Dragoja**, J. Ćurić, M.Vukelić-Marković, G. Bedalov, B. Brkljačić; Sl.Brod/Zagreb, HR. **Mucus impaction at urethero- ileal anastomosis mimics tumor recurrence at patient after Hautmann operation – CT urography and MRI imaging**

Late complications after Hautmann ileal neobladder include those neobladder related and non related. One of most frequent late neobladder related complication is urethral stenosis or stricture at place of urethero-ileal anastomosis caused by postinflammatory changes, fibrosis, or tumor recurrence. We present a case report of 48y male patient who developed right sided hydronephrosis one year after radical cystectomy followed by Hautmann ileal neobladder with chimney modification. Right sided hydronephrosis was determined at regular ultrasound postoperative follow up. CT urography revealed soft tissue luminal defect at right sided urethero – ileal anastomosis with irregular and slightly thickened urethral wall what was suspected to be tumor recurrence. Cystoscopy was performed and showed impacted mucus at right chimney without direct signs of tumor recurrence. Mucus was removed by fiber wire. Control pelvic MRI followed up 3 and 6 months after cystoscopy showed total regression of right sided hydronephrosis and normal urethral wall.

IV-9. **Sung Eun Rha**, Michael Yong Park, Yu Ri Shin, Soon Nam Oh, Jae Young Byun; Seoul, KR. **Imaging Findings of Papillomatous Lesions of the Bladder**

Purpose: To demonstrate the imaging findings of papillomatous lesions of the bladder. **Materials and Methods:** Of 1,567 patients with bladder pathology reports between 2003 and 2010, total 20 patients with bladder papillomatous lesions were included. CT scans were available in five patients with papillomas and eight patients with inverted papillomas. Also, six patients with inverted papillomas and two patients with papillomas had intravenous urography (IVU) or ultrasound (US). Two radiologists evaluated the imaging findings. **Results:** On CT, a mixture of papillary/fingerlike (n=5), ovoid (n=5), and focal wall thickening-like (n=3) lesions were noted. All lesions were located at the posterior wall of the bladder with nine (69%) located at the bladder trigone. Seven cases showed a taller-than-wide appearance with five cases showing a pedunculated appearance. None of the lesions had adjacent bladder wall thickening, perivesical fat infiltrations, or lymphadenopathy. On IVU or US, seven cases showed an oval appearance with one case presenting as focal wall thickening on US. **Conclusion:** The imaging findings of papillomas and inverted papillomas overlap with urothelial cell carcinomas with a less than T3 staging. They arise from the bladder trigone or neck, sometimes show a pedunculated appearance, and do not show invasive findings on imaging modalities.

IV-10. **Deuk Jae Sung**, Shin Young Whang, Beom Jin Park, Min Ju Kim, Sung Bum Cho, Yun Hwan Kim, Kyoo Byung Chung; Seoul, KR. **Preoperative Detection and Localization of Accessory Pudendal Artery with Contrast-enhanced MR Angiography**

To evaluate the feasibility of contrast-enhanced magnetic resonance angiography (CE-MRA) for detection and localization of accessory pudendal arteries (APAs) in patients with prostate cancer. 127 patients underwent CE-MRA following prostate MRI at 3.0 T before robot-assisted laparoscopic radical prostatectomy (RALP). APAs were defined as any arteries located in the periprostatic region and anastomosed with the common penile artery or its branches, and they were subclassified into lateral and apical APAs. For detecting and localizing APAs, MR angiograms were evaluated prospectively by one reader and retrospectively by two independent readers. Diagnostic performance was determined on a per-patient basis by using surgical findings as the reference. Interreader agreements were assessed by using κ statistics. At surgery, 19 APAs were detected in 16 patients, and 16 of these APAs were localized in 13 patients at CE-MRA. Prospectively, sensitivity, specificity, and accuracy of CE-MRA were 81.3%, 93.7%, and 92.1%, while they were retrospectively 87.5%, 91.9%, and 91.3% for reader 2 and 75.0%, 90.1%, and 88.2% for reader 3, respectively. Overall interreader agreement was substantial ($\kappa = 0.770$). CE-MRA can be useful for detecting APAs and could play an important role in facilitating APA-sparing RALP for a possible favorable influence on postoperative erectile function.

IV-11. **Deuk Jae Sung**, Kyung Won Doo, Beom Jin Park, Min Ju Kim, Sung Bum Cho, Yu Whan Oh, Kyoo Byung Chung; Seoul, KR. **Detectability of Low and Intermediate or High Risk Prostate Cancer with Combined T2-weighted and Diffusion-weighted MR Imaging**

To evaluate the diagnostic ability of DWI in combination with T2WI to detect low risk (Gleason score, 6) and intermediate or high risk (Gleason score ≥ 7) prostate cancer. Eighty one patients with prostate cancer who underwent MRI at 3.0 T were

included. Retrospectively, two readers scored independently the probability of tumor on T2WI, ADC maps, and T2WI plus ADC maps. The data were divided into two groups: low risk (n=37) and intermediate or high risk prostate cancer (n=44) and correlated with histopathologic results. Mean ADC values of visible tumors were correlated with Gleason scores. For both readers, the area under ROC curve of T2WI plus ADC maps was greater than that of T2WI (reader 1, 0.84; reader 2, 0.74 vs reader 1, 0.81; reader 2, 0.68, respectively; $p < 0.01$) in intermediate or high risk prostate cancers, but not in low risk prostate cancers (reader 1, 0.70; reader 2, 0.65 vs reader 1, 0.70; reader 2, 0.63, $p > 0.05$). There was a significant negative correlation between ADC values and Gleason scores ($p < 0.05$). The addition of DWI to T2WI improves the accuracy to detect intermediate or high risk prostate cancers, but not for low risk prostate cancer detection.

IV-12. Christopher Wilkinson, H.Bardgett; Leeds, UK. Female MR Urethrography - Anatomy, Technique and Imaging Findings with Surgical Correlation

Clinical evaluation of women with urethral symptoms is difficult, but it is important to identify those with urethral diverticulae or paraurethral cysts as a cause, as these are potentially surgically treatable. These entities present with non-specific and widely varying symptoms and physical examination is often normal or non-specific. Imaging therefore plays a key role in diagnosing or excluding paraurethral pathology as the cause. MRI offers excellent visualisation of the urethra and periurethral tissues in this patient group. We present the MRI findings of all 16 patients who underwent MR urethrography for the investigation of urethral symptoms at our institution over a 2 year period. Using clear illustrations throughout we first outline the normal anatomy of the urethra and surrounding pelvic structures. Review is made of MR technique and our experience with intra-urethral contrast. We then highlight the MRI findings of multiple urethral and periurethral pathologies with surgical and pathological correlation, including urethral diverticulae, haemorrhagic and non-haemorrhagic paraurethral cysts (Gartner duct cysts and Skene duct cysts) and periurethral fibrosis.

IV-13. Christopher Wilkinson, D.Tolan, J.Brittenden; Leeds, UK. Multimodality Imaging of Urinary Diversions – Postoperative Anatomy, Surgical Complications and Imaging Technique Optimisation

Urinary diversion is a common urological procedure, but the postoperative imaging can be complex and accurate interpretation requires technique optimisation as well as a thorough understanding of operative methods. Using clear illustrations we outline the surgical techniques (including common variations) and normal postoperative anatomy for different types of urinary diversion including incontinent conduit diversions, continent catheterizable reservoirs and orthotopic neobladders. We highlight the particular aspects of surgical technique that help explain the reasons why certain complications occur at certain times and anatomical sites. Using multiple modalities we then illustrate the imaging findings of a wide variety of complications that can arise following urinary diversion, including particular techniques to improve the detection of: urinary leak, gastrointestinal anastomotic leak, urinoma, abscess formation, conduit stenosis, ureteral stricture, tumour recurrence, hernias and calculus formation. This presentation will provide an excellent resource for those wishing to extend their understanding of all aspects of post-operative urinary diversion imaging.

IV-14. Imran Demirci, Yuksel Barut, Yesim Karagoz; Istanbul, TR. A Case of Primary Urethral Carcinoma

Urethral cancer is an extremely rare lesion, with fewer than 2000 reported cases. Urethral cancer comprises less than 1% of the total incidence of malignancies. Because many medical centers see only a few cases over many years, not enough data are available from large series to dictate the best-accepted treatment. Herein, we present the case of the 77-year-old male with urethral cancer. He presented with acute urinary retention, perineal pain, dysuria. Magnetic resonance imaging (MRI) revealed a urethral tumor. Urethral cancer has been reported within an age range of 13-90 years, thus occurring at almost any age; however, it is observed most commonly during the seventh decade of life. The etiology of urethral cancer is obscure. Various studies cite infection and chronic irritation as etiologic in the tumorigenesis of this malignancy. In males, the most common sites of extension are the vascular spaces of the corpora and periurethral tissues, deep tissues of the perineum, urogenital diaphragm, prostate, and the penile and scrotal skin, where it causes abscesses and fistulae.

Posters V – Gynaecology

V-1. Kamran Moshirian Ghodduci, Marijana Antic, J. De Mey; Brussels, BE. Unusual location of an ectopic pregnancy

Learning Objectives: Evaluation of an ectopic pregnancy developing in a previous caesarean section scar. Background: A 41 year old woman presented to the emergency department with a one week history of lower abdominal pain and vaginal bleeding for a month. Her previous surgical history included 3 caesarean sections. Blood results were normal apart from an elevated Beta-hCG level. On transvaginal ultrasound an ectopic pregnancy was detected and MRI confirmed an ectopic pregnancy developing in a previous caesarean section scar. Imaging Findings: Transvaginal ultrasound showed a gestational sac outside the uterine cavity of approximately 8 weeks gestational age. MRI confirmed the presence of a 6cm gestational sac implanted in an ectopic position in a caesarean section scar just superior from the cervix and adjacent to the bladder. Conclusion: Pregnancy implantation within the scar of a previous caesarean section is one of the rarest locations of an ectopic pregnancy. Reports of such pregnancies have grown in the last few years, possibly as a result of an increasing number of caesarean sections. Early diagnosis of this condition allows for preserving the uterus and subsequent fertility. However a delay in either diagnosis or treatment can lead to uterine rupture, hysterectomy and significant maternal morbidity.

V-2. **Dulce Antunes**, Teresa M.Cunha; Lisbon, PT. **Tamoxifen gynecological side effects: the role of imaging.**

Learning objectives: description of the imaging features of gynecological side effects of tamoxifen. Background: Tamoxifen is the anti-estrogenic treatment of choice for breast cancer patients. The proliferative effects of postmenopausal tamoxifen have been associated with endometrial hyperplasia, polyps, carcinoma and sarcoma. Tamoxifen treated patients also have higher incidence of leiomyomas, adenomyosis and endometriosis, as increased risk of ovarian cysts and fibromas. Imaging findings: The vigilance of women under tamoxifen includes transvaginal ultrasound (TVS). The commonest endometrial pattern is thickening with cystic spaces. Frequently polyps can be identified, sometimes with eco-Doppler definition of the stalk. On T2-WI thickened and heterogeneous endometrium with lattice-like enhancement, as the enhancement of the endometrial-miometrial interface have been associated with worse prognosis (polyps, atypical hyperplasia, cancer). MR is also indicated for staging invasive disease. TVS and MR are helpful in characterization of adnexal lesions, namely for the differential with ovarian metastases and primary cancer. Conclusions: TVS is the first line imaging modality in the surveillance of women treated with tamoxifen, the most common changes being endometrial thickening and signs of adenomyosis. MR is indicated for further evaluation in presence of imaging or histopathologic signs of malignancy.

V-3. **Athina C.Tsili**, M.I.Argyropoulou, L. Tzarouchi, G. Koliopoulos, Th. Stefos, K. Tsampoulas; Ioannina, GR. **Apparent diffusion coefficient values of the normal uterus: interindividual variations during menstrual cycle**

Objectives: To assess the apparent diffusion coefficient (ADC) changes of the normal uterine zones among reproductive women during the menstrual cycle. Materials and Methods: The study included 101 consecutive women of reproductive age. Diffusion-weighted (DW) imaging was performed along the axial plane, using a single shot, multi-slice spin-echo planar diffusion pulse sequence and a b-value of 800 sec/mm². The mean and standard deviation of the ADC values of normal endometrium/myometrium were calculated for menstrual, proliferative and secretory phase. Analysis of variance followed by the least significant test was used for statistical analysis. Results: The ADC values of the endometrium were different in the three phases of the menstrual cycle (menstrual phase: 1.25±0.27; proliferative phase: 1.39±0.20; secretory phase: 1.50±0.18). Statistical significant difference was observed among all groups. The ADC values of the normal myometrium were different in the three phases of the menstrual cycle (menstrual phase: 1.91±0.35; proliferative phase: 1.72±0.27; secretory phase: 1.87±0.28). Statistical significant difference was observed between menstrual and proliferative phase and between proliferative and secretory phase. No significant difference was noted between menstrual and secretory phase. Conclusions: A wide variation of ADC values of normal endometrium and myometrium is observed during different phases of the menstrual cycle.

V-4. **Eva Batista, T.M.Cunha**, Lisbon, PT. **Algorithmic approach to adnexal lesions imaged at ultrasonography.**

Learning objectives: present a practical approach to adnexal lesions imaged at ultrasonography (US) Background: The most common incidentally found or clinically suspected adnexal lesions are benign and can usually be reliably recognized on the basis of their typical US features. Imaging findings: Simple cysts with less than 3cm should be considered a normal physiologic finding in premenopausal women, requiring no follow up. If larger than 5cm in premenopausal women or than 1cm in postmenopausal women, yearly US follow up is recommended. For classic hemorrhagic cysts larger than 5cm in premenopausal women and regardless of size in early postmenopausal women, short interval US follow up (6-12 weeks) is recommended to ensure resolution. Lesions with classic features of endometrioma or mature cystic teratoma can be followed with US (6-12 months), depending on age and size. MR is recommended in undetermined complex and solid adnexal lesions or in tumors of undetermined origin. In complex lesions with thick septations, solid elements with Doppler flow and focal wall thickening, surgical evaluation should be considered. Conclusions: The use of a systematic approach to US adnexal masses allows referral of lesions requiring further evaluation and/or surgery and limits the need for follow up examinations and unnecessary surgery.

V-5. **Laura Buñesch**, B. Paño, M. Carmen Sebastià, R. Salvador, F. Carmona, C. Nicolau; Barcelona, ES. **Endometriosis presented as a great mimic.**

PURPOSE: - To review the histopathological basis of endometriosis and the typical radiologic appearances of the disease. - To show the clinical and radiological scenarios in which endometriosis can mimic other pathological entities. - To present the radiological keys to achieve a correct diagnosis of endometriosis in these scenarios. SUMMARY: Endometriosis is a surprising and intriguing gynecologic disorder in which endometrial tissue implanted outside the uterine cavity proliferates and bleeds in response to hormonal stimulation, this way generating a local inflammatory reaction and, eventually, extensive fibrosis and organ infiltration. This process may cause classical symptoms that will lead the clinician to the correct diagnosis (dysmenorrhea, dyspareunia, pelvic pain and infertility). In many cases, however, the clinical presentation of the illness can mimic other pathological entities, making the diagnosis almost impossible for the clinician. We will present endometriosis clinically and/or radiologically mimicking different abdominal neoplastic or inflammatory processes. We will also review the radiological differential diagnosis in these scenarios, showing the keys for the correct diagnosis of endometriosis.

V-6. **Kie-Hwan Kim**, KS Cho, SB Nam, BH Lee; Seoul, KR. **Imaging Findings of Primary Tubal Malignancy**

Purpose: To describe the radiologic findings of primary tubal malignancy. Materials and Methods: This study included 27 patients who were pathologically confirmed as primary tubal malignancy. Twenty-three patients underwent CT, 3 MRI and 4 ultrasonography. Image finding were evaluated according to size, proportion of cystic portion, shape and associated finding of tumor. Results: The mean diameter of tumors was 5.4. According to proportion of cystic portion within the

tumor, each case was one of the four categories (type I: >75% of cystic portion, type II: 50- 75%, type III: 25- 50%, type IV: <25%). There were 9 cases (33.3%) in type I, 2 cases (7.4%) in type II, 3 cases (11.1%) in type III and 13 cases (48.1%) in type IV. According to the shape of tumor, 6 cases (22.2%) were round, 12 cases (44.4%) were lobular and 9 cases (33.3%) were tubular. Septa were noted in 13 cases (29.6%), wall thickening in 13 cases (30.7%) and hydrosalpinx in 11 cases. Conclusion: It is difficult to differentiate primary tubal cancer from ovarian cancer, but when it is associated with hydrosalpinx or the shape of tumor is lobular or tubular, primary tubal cancer can be suggested in differential diagnosis.

V-7. **Kyoung Ah Kim**, Sang-Wook Yoon; Gyunggi-do, KR. **Thousands Faces of Borderline Ovarian tumors**

Purpose 1. To present various imaging findings of BOT and correlate with pathologic finding 2. to discuss clue for diagnosis of BOT 3. To show various extent and stage of BOT on different imaging study 4. To present the clinical data after treatment of BOT Content organization 1. anatomy of ovary 2. WHO classification of BOT 3. Epidemiology of BOT 4 FIGO staging of BOT 5. imaging finding of BOT depending on histology or stage 1) Mucinous 2) Serous 3) Mixed 4) Brenner 5) mature cystic teratoma association 6. Unusual BOT 1) seeding 3) metastasis

V-8. **Satomi Kitai**, Satoshi Matsushima, Takao Igarashi, Goh Kawakami, Tohru Sekiya, Kunihiro Fukuda; Tokyo, JP. **Serous tumors in female pelvis: Imaging findings**

Serous tumors arise in ovary, fallopian tube, uterus and peritoneum, so-called secondary mullerian system, from benign to malignant, and various kinds of serous tumors are there in female pelvis. Serous carcinomas are the most common histological subtype of ovarian cancer. Imaging findings and therapeutic choice differs between malignant and borderline ovarian tumors. Fallopian tube carcinoma is relatively rare and often difficult to differentiate from ovarian tumors but certain imaging features may provide indication to diagnosis. Peritoneal carcinoma can be suspected by imaging and elevation of CA125 together. Manifestation of uterine serous carcinoma differs from endometrial carcinoma. The origin of serous carcinoma is a curious genetic topic. So the purpose of this study is to review clinical features and genetic aspects of serous tumors in female pelvis, to present images by CT and MRI of serous tumors in the pelvis and to discuss imaging features of serous tumors in female pelvis. Understanding imaging features of serous tumors in female pelvis will be useful for daily practice.

V-9. **Harpreet Lyall**, Ashley Uttley; Leeds, UK. **Female Ultrasound: Uterus Normal variations and Pathology**

An educational poster illustrating the normal range of ultrasound appearances of the Uterus and a selection of common diseases.

V-10. **Min Hoan Moon**, Chang Kyu Sung, Jeong Yeon Cho, Seung Hyup Kim; Seoul, KR. **US imaging findings of pregnancy-associated ovarian disorders**

Ovarian mass in pregnant women is not uncommon problem in a clinical practice. Ultrasound is the modality of choice for imaging pregnant female pelvis and, in most cases, it provides sufficient information to counsel the pregnant women, manage the pregnancy, and direct the further evaluation. This exhibition will present the broad spectrum of US imaging findings of pregnancy-associated ovarian disorders, arranged with separate subject sections, covering functional cyst, luteoma, acute pelvic pain, tumorous and non-tumorous ovarian mass, and ovarian vein thrombosis. Hyperreactio luteinalis, ovarian hyperstimulation syndrome, and polycystic ovarian disease will be also presented in the section of functional cyst.

V-11. **Kemal Odev**, H. Ozbiner, C. Geredeli, T. Guler, L. Koral, D. Tastekin, C. Boruban, M. Artac; Konya/TR. **Cardiac metastasis and pulmonary embolism due to malignant melanoma of uterine cervix: clinical and imaging findings**

Primary malignant melanoma of the cervix is a rare disease with a poor prognosis. A 63-year-old female presented with a complaint of vaginal bleeding. Gynecological examination revealed marked enlargement of uterine cervix and cervix carcinoma was suspected. Thus, a biopsy of cervix was taken, which revealed melanoma. Then, MRI examination was performed to evaluate the extension of the disease. On MRI, solid cervical mass generated high signal intensity on both T1- and T2-weighted images. Laparotomy was performed and tumor, predominantly involving the cervix was confirmed. The pathological diagnosis of the resected specimen was malignant melanoma of the cervix. The patient was treated with combination chemotherapy: temozolamid 200mg/m² for 1 to 5 days and adjuvant chemotherapy with dacarbazine 200mg/m² for 1 to 4 days was followed. Following chemotherapy, she presented with dyspnea at rest. Transoesophageal echocardiogram revealed nodular lesions attached via a pedicle to the right- and left atrial wall of the heart. Dynamic thorax CT and cardiac MRI showed masses involving the wall of the right- and left atrium. Moreover, CT revealed pulmonary embolism at the level of the left and right pulmonary arteries and its branches. Despite the chemotherapy, the patient's condition deteriorated, she died from respiratory and cardiovascular failure.

V-12. **Yui Onoda** Ayako Tamura, Takuya Ueda, Yukihisa Saida; Tokyo, JP. **MRI findings of müllerian mucinous borderline tumors in a pregnant woman differentiated from decidualized endometriotic cysts**

Objective: To report MRI findings of müllerian mucinous borderline tumor (MMBT) in a pregnant woman mainly focusing differential diagnosis from decidualized endometriotic cyst. Case Report and study: A 37-year old woman at 14 weeks of gestation presented to our hospital due to gradual growth of followed endometriotic cysts of the both ovaries. Mural nodules were detected in the right endometriotic cyst on MRI at 16 weeks of gestation. The mural nodules showed similar intensity to deciduas on T1 and T2-weighted images, and showed slightly higher intensity on diffusion weighted images. The surface of the nodules showed papillary configuration, which suggested neoplastic formation in the cysts. At 18 weeks of gestation, bilateral cystectomy was performed and tumors were proven to be MMBTs histopathologically. In

this case report, we will discuss MR findings of MMBT, compared with decidualized endometriotic cysts without MMBT in 5 patients. Conclusion: Despite the difficulty to distinguish MMBT from decidualization in endometriotic cyst during pregnancy, MRI findings may suggest concomitant presence of MMBT by the presence of papillary solid nodules.

V-13. **Maria Joana Rebelo de Almeida**, T. M.Cunha, Lisboa, PT. **Guidelines for gynaecological ultrasound**

Purpose: Develop a strict protocol and code of conduct for performing gynaecologic ultrasound examinations.

Introduction: The gynecological ultrasonography (transabdominal and transvaginal) is a non invasive, readily available imaging technique that has greatly enhanced diagnostic sensitivity and accuracy for diagnosing gynecologic diseases. Some mistakes are made when the technique is not correctly performed, so it is important to standardized the procedure to minimize the risk of medical errors. **Technique:** To perform a good examination, the patient must have an adequate preparation and a clinical history should be obtained. The scan should include transabdominal and transvaginal evaluation. These scans are complementary and both should be considered. The examination must be performed to access every organ and anatomic region in the female pelvis in an organized manner. The report should use appropriate anatomic, pathologic, and radiologic terminology to describe the findings. **Conclusion:** The gyneacological scan must have performance guidelines that every radiologist should follow in order to prevent misdiagnosis.

V-14. **Sung Eun Rha**, Michael Yong Park, Yu Ri Shin, Soon Nam Oh, Jae Young Byun; Seoul, KR. **Metastatic tumors of the ovary: Imaging spectrum with radiologic-pathologic correlation**

Purpose: The purpose of this presentation is to illustrate a wide spectrum of imaging findings of metastatic ovarian tumors. **Content:** Differentiation between primary and metastatic ovarian carcinoma is of great importance with respect to treatment and prognosis. However, imaging findings of metastatic tumors of the ovary are variable, ranging from predominantly cystic to predominantly solid appearance, depending on the primary focus and size. The purpose of this exhibit is to illustrate various CT and/or MR imaging findings of metastatic tumors of the ovary based on radiologic-pathologic correlation.

V-15. **Vivien Shuen**, R.Thomas, G. Miles, D. DeFriend; Plymouth, UK. **Pictorial review of Uterine Sarcomas: Diagnosis pitfall, disease progression and complications**

Sarcomas of the uterus can be a challenging and calamitous diagnosis, both for the clinician and patient. These rare tumours require prompt imaging, diagnosis and treatment in order to prevent disease progression and its complications. Their appearances on imaging can however be complex and puzzling. In this review we will present examples of the unusual features including: initial misdiagnosis of leiomyosarcoma, the varied metastatic spread and its complications including perforation with different imaging modalities.

V-16. **Aki Takahashi**, Junko Takahama, Nagaaki Marugami, Saeka Hori, Megumi Takewa, Takahiro Itoh, Satoru Kitano, Kimihiko Kichikawa; Kashihara, Nara, JP. **Uterine Corpus Cancer: Imaging findings and clinical appearance of type1 and type2 cancers.**

PURPOSE 1. To understand differences of the concepts between type 1 and 2 uterine corpus cancers. 2. To review the imaging findings at presentation, metastases and recurrence focusing on the characteristic on each of Type1 and Type2. **CONTENTS 1.** Type 1 uterine corpus cancer; a. Imaging findings, b. Pathology, c. Etiology, d. New FIGO and TNM classification 2. Type 2 uterine corpus cancer; a. Imaging findings at presentation and at recurrence: where to look for metastatic disease, b. Pathology, c. Etiology **SUMMARY** Uterine corpus cancer is the common gynecologic malignancy and is divided into two clinicopathological subtypes. Type1 is estrogen-related and develop slowly from endometrial hyperplasia in the setting of hormonal imbalance. It has a propensity for local invasion. Type2 is non-estrogen-related (variant of non-endometrial carcinoma such as papillary serous carcinoma) and high incidence of peritoneal and lymphovascular metastases. When Type2 uterine corpus cancer is diagnosed in the preoperative setting, careful interpretation should be performed even if the primary disease is seems to be early stage.

V-17. Kyung Jin Nam, **Seong Kuk Yoon**, Hee Jin Kwon, Jin Han Cho, Jong Young Oh; Busan, KR. **Imaging features of genital tuberculosis**

Tuberculosis is the most common fatal infectious disease in the world and remains a major global public health problem. Extrapulmonary tuberculosis (EPTB) has been used to describe disease outside the lung. The genitourinary system is one of the most common sites of involvement by extrapulmonary tuberculosis, accounting for 15%–20% of infections. In cases of genital organ involvement, the route of disease spread includes hematogenous seeding, lymphatic spread, and direct extension from the lower urinary tract. The manifestation of genital tuberculosis can be variable and cause a variety of imaging findings that mimic other diseases. In this review, various imaging features of tuberculosis affecting the female and male genital organs are illustrated.



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